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THE WILLIAMSPORT AREA COMMUNITY COLLEGE

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THE WILLIAMSPORT AREA COMMUNITY COLLEGE

GENERAL CATALOG

AND

ANNOUNCEMENT OF COURSES

1967-1968

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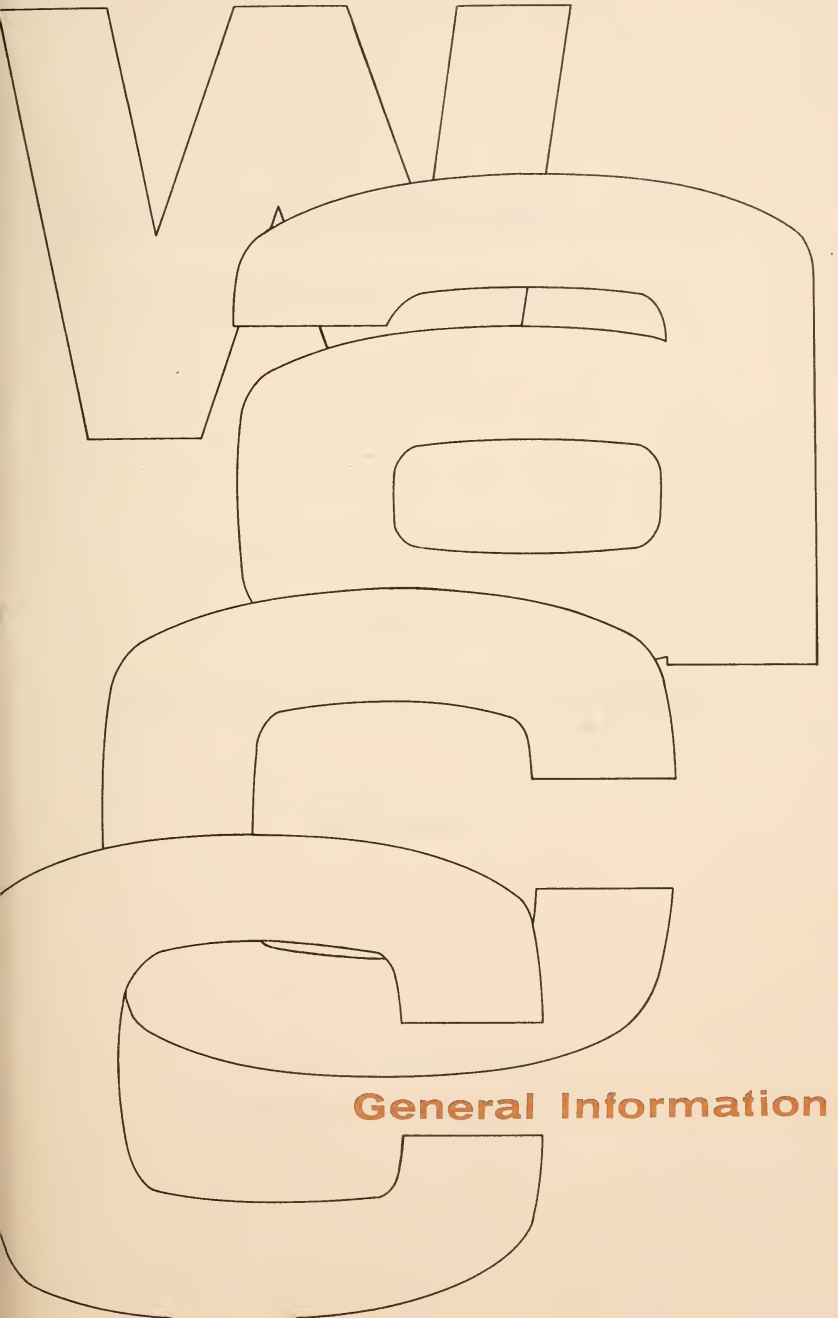

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David E. Horlacher — *Lecturer in Economics*
M.A., *University of Pennsylvania*

Leonard Lash — *Lecturer in Psychology*
Ph.D., *University of Michigan*

William Perkins — *Lecturer in Physics*
M.S., *University of Florida*

James C. Rogers, Jr., C.P.A. — *Lecturer in Accounting*
B.S., *The Pennsylvania State University*

J. Paul Shaffer — *Lecturer in Education*
Ed.D., *New York University*

John J. Sullivan — *Lecturer in History*
M.A., *Bucknell University*

APPLIED ARTS AND SCIENCES

Rollin L. Albert — *Instructor of Toolmaking Technology*

Donald R. Aurand — *Instructor of Mathematics*
M.S., *Yeshiva University*

Alex W. Bailey — *Instructor of Business Administration*
B.S., *Indiana University*

Joanne B. Barker — *Instructor, Surgical Technician Program*
R.N., *University of Pennsylvania Hospital*

Margaret W. Baldwin — *Assistant Professor of Business Education*
M.A., *Columbia University*

Arthur E. Barr — *Instructor of Aviation Mechanics*

Donald B. Bergerstock — *Assistant Professor of Business Education*
M.A., *Bucknell University*

William S. Best — *Assistant Professor of Sign Painting*
M. Equiv.

Frederick L. Bierly — *Instructor of Mathematics*
B.S., *Lock Haven State College*

Clarence E. Bierman — *Instructor of Toolmaking Technology*

Clyde L. Brass — *Instructor of Service & Operation of Heavy Construction Equipment*

James P. Bressler — *Associate Professor of English*
M.S., *The Pennsylvania State University*

Norman E. Briggs — *Assistant Professor of Electronics Technology*

Charles A. Brooke — *Instructor of Mathematics*
A.B., *Lycoming College*

Larry S. Clark — *Instructor of Welding Technology*

Clyde C. Cotner — *Associate Professor of Building Construction Technology*
M. Equiv.

Lloyd C. Cotner — *Instructor of Architectural Drafting Technology*

Harry N. Crain — *Assistant Professor of Diesel Technology*
M. Equiv.

J.Carl Crouse — *Associate Professor of Architectural Drafting Technology*
M. Equiv.

Joseph M. Cuff — *Instructor of Office Machine Repair*

Robert A. Culver — *Instructor of Tile Setting*

Jean M. Cunningham — *Instructor of Practical Nursing*
B.S., *Columbia University*

Robert W. Dannelley — *Instructor of Electrical Instrumentation Technology*

Roger E. Davis — *Instructor of Mathematics*
M.S., *Bucknell University*

Clinton B. Dawes — *Instructor of Electronics Technology*

Jack C. Deibert — *Associate Professor of Graphic Arts*
M. Equiv.

Harry E. DeRemer — *Instructor of Automotive Technology*

Robert W. Dittmar — *Instructor of Mechanical Drafting Technology*
B.A., *Geneva College*

William H. Ealer — *Instructor of Architectural Design Technology*
B. Arch., *Rensselarer Polytechnic Institute*

Charles A. Ellis — *Instructor of Computer Science Technology*

Rolland S. Fague — *Instructor of Building Construction Technology*

Donald M. Flynn — *Assistant Professor of Diesel Technology*
M. Equiv.

E. Wayne Frey — *Lecturer in Mathematics*
A.B., *Lycoming College*

George W. Gesler — *Instructor of Office Machine Technology*

Glen F. Getchen — *Instructor of Toolmaking Technology*

Edward M. Gray — *Instructor of Toolmaking Technology*

Bert M. Green — *Assistant Professor of Economics*
M.A., *Bucknell University*

Frank C. Grenoble — *Assistant Professor of Building Construction Technology*
M. Equiv.

Anthony M. Guravage — *Instructor of Electrical Construction Technology*

William F. Haney — *Assistant Professor of Automotive Technology*
M. Equiv.

Lynn B. Harlan, *Department Chairman* — *Instructor of Toolmaking Technology*

Walter K. Hartman — *Instructor of Technical Illustration*

Alfred L. Hauser — *Instructor of Toolmaking Technology*

Regina F. Hepner — *Instructor of Practical Nursing*
R.N., *St. Joseph's Hospital*

John H. Hilsher, Jr. — *Instructor of Graphic Arts Technology*

William G. Hitchens — *Instructor of Patternmaking*

Edward G. Hook — *Lecturer in Computer Science*

John W. Hough — *Assistant Professor of Electrical Construction Technology*
M. Equiv.

KENNETH A. JACKSON — *Assistant Professor of Metallurgy and Physics*
M.S., *University of Alberta*

PAUL L. JACOBS — *Instructor of Mechanical Drafting Technology*

FORREST JOHNSTON — *Instructor of Toolmaking Technology*

FRED R. JONES, *Department Chairman* — *Assistant Professor of Drafting Technology*
M. Equiv.

JOHN H. JONES — *Instructor of Mathematics*
B.S., *The Pennsylvania State University*

H. EUGENE KAST — *Assistant Professor of Automotive Mechanics*
M. Equiv.

FRANCIS H. KITCHEN — *Instructor of Toolmaking*

GEORGE C. KRAUSE — *Instructor of Sheet Metal*

HARVEY H. KUHNS, JR. — *Instructor of Economics*
M.S., *Bucknell University*

JOHN H. LEGO — *Instructor of Mathematics*
B.S., *The Pennsylvania State University*

PATRICIA E. LEWIS — *Instructor of Mathematics*
B.S., *Lycoming College*

JAMES E. LOGUE — *Instructor of English*
M.A., *Bucknell University*

JOSEPH C. LONDON — *Instructor of Electronics Technology*

RICHARD C. LONG — *Assistant Professor of Audio-Visual Aids*
M. Equiv.

ROBERT C. MACHINSKI — *Lecturer, Library Associate Program*
M.L.S., *University of Denver*

LOUIS J. MALLOTT — *Instructor of Electronics Technology*

JOHN W. MANN — *Instructor of Toolmaking Technology*

HOWARD G. MANNING — *Instructor of Auto Body Repair*

JOSEPH G. MARK — *Lecturer in Architecture*
B.S., *The Pennsylvania State University*

FRANK A. MCGINN — *Instructor of Plumbing Technology*

ROBERT C. MCEWEN — *Lecturer in Civil Technology*

PAUL L. MCQUAY — *Instructor of Tool Design Technology*

DALE A. METZKER — *Instructor of Graphic Arts Technology*

ANGELO D. MICHELE — *Assistant Professor of Aviation Mechanics*
M. Equiv.

JACK A. MIRTO — *Instructor of Automotive Mechanics*

THELMA S. MORRIS — *Coordinator, Practical Nursing*
R.N., B.S., *The Pennsylvania State University*

WILLIAM L. MOSTELLER — *Assistant Professor of Electronics Technology*
M. Equiv.

EWING W. MUESELER — *Associate Professor of Automotive Technology*

CHARLES A. MUSARRA — *Instructor of Computer Science Technology*

HAROLD L. NEWTON — *Instructor of Graphic Arts Technology*

SLOAN O'DONNELL — *Assistant Professor of English*
M.S., *The Pennsylvania State University*

George W. Orren, Jr. — *Instructor of Business Administration*
B.S., *Susquehanna University*

Ramon H. Palmer — *Associate Professor of Physics*
M.E., *Cornell University*

C. Frank Pannebaker — *Instructor of Aviation Mechanics*

Earl L. Parrish — *Instructor of Toolmaking Technology*

G. David Porter — *Instructor of English*
B.S., *Lock Haven State College*

David A. Remington — *Lecturer, Library Associate Program*
M.L.S., *Rutgers University*

John H. Renninger — *Assistant Professor of Electric Motor Rewinding*
M. Equiv.

Lee E. Roush — *Instructor of Automotive Mechanics*

Marlin M. Roush — *Instructor of Automotive Technology*
M. Equiv.

Richard Russell — *Lecturer, Library Associate Program*
B.S., *State University of New York*

Martin K. Salabes — *Assistant Professor of Electronics Technology*
B.E.E., *Cornell University*

Melvin R. Schreffler — *Instructor of Building Construction*

Chester G. Schreiber — *Assistant Professor of Electrical Construction*
M. Equiv.

Gorman S. Shaffer — *Instructor of Toolmaking Technology*

William F. Shade — *Instructor of Mechanical Drafting Technology*

Paul E. Shoemaker — *Instructor of Toolmaking Technology*

Joseph G. Sick — *Assistant Professor of Agriculture*
M.S., *The Pennsylvania State University*

Charles Q. Simcox — *Instructor of English*
M.S., *Bucknell University*

Leroy Simpson — *Instructor of Physics*
B.S., *Lycoming College*

Robert H. Smith — *Instructor of Civil Technology*
B.S.C.E., P.E., *Bucknell University*

Marion H. Snyder — *Instructor of Practical Nursing*
R.N., B.S., *Mansfield State College*

William J. Stitzel — *Instructor of Service & Operation of Heavy Construction Equipment*

Robert A. Stout — *Instructor of Electrical Instrumentation*

Dale Straub — *Instructor of Mechanical Drafting Technology*

Dale B. Sullivan — *Assistant Professor of Business Education*
M.S., *Bloomsburg State College*

Anthony Terrizzi — *Instructor of Technical Illustration*

James A. Thomas — *Instructor of Welding Technology*

Robert G. Thomas — *Assistant Professor of Welding Technology*
M. Equiv.

Chalmer VanHorn — *Instructor of Mechanical Drafting Technology*

Mason S. Wagner — *Assistant Professor of Building Construction Technology*
B.S.C.E., P.E., *Bucknell University*

Jackie E. Welliver — *Instructor of Mechanical Drafting Technology*

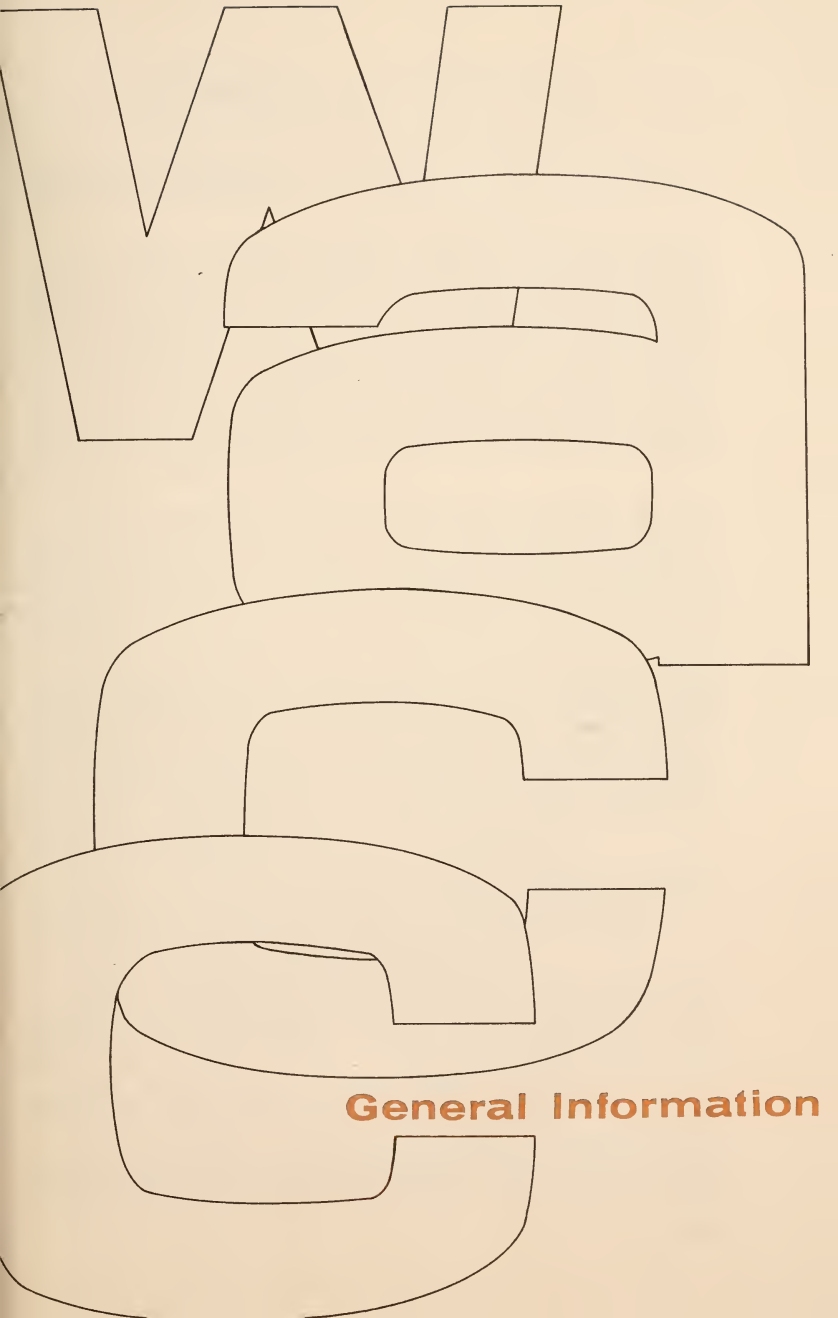
Charles E. Wilkinson, *Department Chairman* — *Assistant Professor of Automotive Technology*
M. Equiv.

Bernard C. Williams — *Instructor of Welding Technology*

George P. Wolfe — *Assistant Professor of Computer Science Technology*
M.S., *Clarkson College of Technology*

Marguerite J. Wright — *Instructor of Practical Nursing*
R.N., *Williamsport School of Nursing*

John J. Yahner — *Instructor of Architectural Drafting*



General Information

GENERAL INFORMATION

Philosophy and Purpose

"Let each become all he is capable of being," characterizes the philosophy and purpose of The Williamsport Area Community College. The College exists to provide two-year programs of higher education for as many residents of the area as possible. Accepting its responsibilities to the national and area community, the College endeavors to educate students for their own self-realization and for the well-being of the society which will be nurtured by their talents and from which leadership will be drawn. The College is completely committed to quality, diversity, social responsibility, and career direction, and it is toward these ends that the campus community strives.

Quality of education, marked by excellence of instruction and appropriate standards of student achievement in all curriculums, is the foremost commitment of the College. To this end the selection of faculty, facilities for instruction, and a high expectancy for student performance reflect the standards of a community which honors excellence in higher education.

Opportunity in higher education for the many is essential to the philosophy of the College. The democratic ideal can not truly flourish when education beyond the secondary school is limited to a financial, social, or intellectual elite. A liberal admissions policy has been designed to extend educational opportunity to all students who show a potential for achievement. Once admitted to the College, the student is offered the maximum of opportunity to develop that potential. Only achievement, however, will determine the success of his performance.

Diversity of educational program represents a further commitment of the College. To provide for student needs, the College offers:

Two-year college-parallel curriculums in liberal arts, education, science, engineering, and business administration;

Two-year occupational curriculums in career, business, and various technologies to prepare graduates for immediate employment in the highly diversified organizations and firms of the area served by the College;

Credit and non-credit courses and community service programs are available for adults in the School of Continuing Education.

Social responsibility is inherent in any program of higher education if the citizen is to expose that education to the test of practice in the national and local community. To this end the College requires that all

associate degree candidates participate in a substantial program of general education in the humanities, social sciences, natural sciences, mathematics, as well as gain competence within a major subject field. Varsity and intramural sports, social events, cultural activities, student clubs, and organizations balance the total educational program. The Student Association, to which all students belong, organizes and directs a varied program on its own initiative and responsibility.

Career direction, the counseling and guidance function of the College, is available through a wide range of services from pre-admission counseling, student orientation, and course planning, through testing and guidance for the clarification of educational and career goals, and eventually job placement.

History

ORIGINS — 1914

The Williamsport Area Community College developed from the Williamsport Technical Institute which had its origins in 1914 as a small industrial arts shop of the Williamsport High School. Since its beginning to its present Community College status the former Institute has proven it can adapt to and meet the demands for trained manpower, regardless of the situation. In fact, the development of the present Community College has been a direct result of this foresightedness and adaptability. War, peace, depression, all have presented manpower training problems. Through the years the former Williamsport Technical Institute came up with a solution to each of the challenges and many of the solutions have gained national attention. Dedication to the principal that education should fit itself to the needs of the individual, the community and the nation made this possible.

Following World War 1 there was the problem of retraining veterans, many being disabled. This led to the establishment of the first adult day school on a full-time basis. Concurrent with this program was the organization of the industrial evening school which has continued to the present day.

COOPERATION WITH LOCAL INDUSTRY — 1927

Evening conferences in foremanship training began in 1927, as a cooperative effort of the school district and the Williamsport Chamber of Commerce, to meet the demand for supervisors in rapidly increasing diversified industries in this area. By this time George H. Parkes had become director of vocational education in the city and it was he who organized and led these early conferences.

In the Twenties, a cooperative course of study was set up for students of the industrial department of the high school. By this plan a

student over sixteen years of age who was proficient in the school shops, was eligible to receive part of his training in the classroom and part through employment in a local plant, alternating the two periods.

One of the first examples of cooperation between the school and local industry occurred during the depression years. The speed and intelligence with which Williamsport met the unemployment problem gained nation-wide recognition.

In 1930 the Chamber of Commerce surveyed local industry and discovered that while unemployment was increasing, there was a substantial and increasing shortage of certain skilled tradesmen. The logical solution was to retain men from the unemployed ranks to fill these vacancies, and the logical place to do it was in the high school vocational shops. Early in 1931 the first experimental class was enrolled. The success of this program, which became known across the country as the Williamsport Plan, was soon evident. It encompassed cooperative training of CCC and NYA youths. WPA made its contribution by providing instructors.

DEFENSE TRAINING — 1940

The adaptability and forsightedness of our vocational leaders was never more apparent than when they met the challenge of a world at war. On May 10, 1940, when the Nazis marched into Holland and Belgium, a shocked United States began an immediate program of rearmament for defense. On May 21 the Board of Directors of the Williamsport School District appointed a special Emergency Training Commission to steer the local vocational program through the changing times. At the end of the regular school term on June 14, the school staff made a swift change from an extensive program of retraining unemployed men and women to an intensive program of training for defense industries. The staff and vocational facilities swung into a 24-hour schedule to meet the demands of industry. By this quick action the school was among the first in the country, if not the first, to gear its program to wartime training.

In 1941 the adult education program and the vocational high school program were merged into one unit known as the Williamsport Technical Institute. Although organized into one vocational education unit since that time, each maintained its own separate program.

In 1942, the aviation shop (including a large hangar) was the first in a public school in the country to be erected at an airport.

VOCATIONAL DIAGNOSTIC PROGRAM — 1951

Feeling a need for a new, more practical method of vocational counseling of rehabilitation clients and clients with limited educational or cultural backgrounds, the school began in 1951 its Vocational Diagnostic Program. Under this program, the only one of its kind in the country at that time, a client enrolled at the school for a three-week

period. During this time he was guided and counseled in his effort to make an occupational choice. The most important phase of the program, and the reason it gained nation-wide interest, was the job-trial method used. With the facilities of the school at his disposal, the client was able to spend two weeks in various shops and thus test his ability and interest under real, rather than imagined conditions.

The fame of the Williamsport Technical Institute as an outstanding vocational center spread beyond the borders of the United States. In 1953 the school was officially approved for the training of foreign students, although several nations were represented on the rolls prior to this. Educators from many foreign countries enrolled at the W.T.I. to study its methods of vocational education in an effort to set up similar centers in their own countries.

MANPOWER TRAINING PROGRAMS — 1956

The most recent demand for trained manpower that W.T.I. met was in connection with the Industrial Development Committee of the Williamsport Chamber of Commerce, which was set up in 1956 to draw new industry to the city. The decision of several companies to relocate here has been attributed to a great extent to the availability of trained workers from the local Institute. Special courses have been geared to meet the specific demands of these companies.

With such developments as these the Williamsport Technical Institute under the leadership of Dr. Kenneth E. Carl, who succeeded Dr. Parkes in 1952, continued to make its important contribution of furnishing practical vocational training to meet the needs of the day.

In 1963 when the Pennsylvania Community College Law was passed, the Williamsport Area School Board, after investigating the advantages of the Community College, joined with a number of area school districts to co-sponsor the college.

COLLEGE PLAN APPROVED — 1965

The plan for The Williamsport Area Community College was officially approved as a public Community College on February 11, 1965 by the Department of Public Instruction. The College actually opened its doors on September 7, 1965, with the first classes starting September 13, 1965.

The College is now operated by a Board of Trustees elected by the school board members of the sponsor districts, with Dr. Kenneth E. Carl as its president.

When the Institute was reorganized as a community college in 1965 a School of Liberal Arts and Sciences was added and the vocational courses were reorganized and strengthened to meet the requirements of a degree granting community college. The College graduated its first students with Associate degrees in Applied Arts and Sciences in June 1966 and will graduate its first class with Associate degrees in Liberal Arts and Sciences in 1967. The College is now meet-

ing the educational needs of all the people by providing quality education in both schools. It is proving its dedication to the principle that education should fit itself to the needs of the individual, the community and the nation.

Facilities and Equipment

The Williamsport Area Community College occupies the plant and facilities of the former Williamsport Technical Institute and uses part of the Williamsport Senior High School building and gymnasium. All of the above plant and the equipment therein used by the College are presently rented from the Williamsport Area School District. It is planned that the College will purchase these buildings and equipment in the near future and will continue to grow in this campus area. The College is using all or part of eleven buildings including two buildings which are rented, one of which is used for a student activities center.

A Look to the Future

The long range plan of the College being formulated under the guidance of nationally known planning and educational consultants will provide for the complete modernization of present facilities. The addition of new buildings and equipment will accommodate a full-time student enrollment of approximately four thousand by 1972.

Now being planned are a new library, a fine arts center and other academic facilities required to meet the needs of curriculum development. The College is moving toward expansion of its modern science laboratories as well as study and work areas for industrial, medical and food service technologies. It looks forward to an enlarged student center and dormitories for approximately nine hundred resident students. The extended campus will ultimately approach one hundred acres in the heart of the city with ready access by urban and freeway traffic. These expanded facilities will help the College make available, to all people in the community, quality education in both Liberal and Applied Arts.

STUDENT LIFE

Freshman Orientation Program

All entering freshmen must attend the orientation program scheduled at the beginning of their first semester. During these sessions the College program and activities are explained to the students. Throughout the year when the need arises, students will be given instruction in efficient study habits, the budgeting of time and the techniques of note-taking and textbook reading. Special instruction in the use of the library is also included so that the student may, at the outset of his college career, appreciate the importance of independent reading and research and learn to make maximum use of library facilities.

Parents' Day

In helping its students, the College welcomes the active partnership of parents. As a feature of its orientation program, which seeks to assist students in adjusting to college life, The Williamsport Area Community College holds a reception for parents in the early part of each school year.

Members of the administrative staff and faculty present the college viewpoint and inform parents of the problems which face young people in college today. Methods of coping with these difficulties, by helping the student develop proper habits of study and self-discipline, are discussed.

The College seeks, by acquainting parents with various aspects of academic life, to achieve a measure of collaboration in working for the best interests of the student.

Student Organizations and Activities

In fully subscribing to the belief that social, cultural, athletic and recreational activities are an important part of its educational program, the College provides an extensive and diversified program of co-curricular activities. Students are encouraged to avail themselves of the various opportunities and to participate in them.

Student Government and Club Activities

Opportunities for self-government and assuming responsibility through the democratic process are offered students of The Williamsport Area Community College by the Student Association.

Clubs and organizations are: Circle K Club, Outing Club, Drama Club, Architecture Club, International Relations Club, Bowling Club, Ski Club.

Student Publications

The official College newspaper is the *Spotlight* published at regular intervals throughout the College year.

Staff positions for the *Spotlight* are open to first and second year students.

The *Student Handbook,* published annually, contains College information and regulations.

Cheerleading

Cheerleaders represent the student body at all athletic contests. This activity is under the direction of Mrs. Regina Hepner. Tryouts are held each fall and any student may try out for the squad. Squad members are selected on the basis of skill, personality, poise and enthusiasm.

College Colors and Nickname

The colors of The Williamsport Area Community College are gold and burgundy and the athletic teams are nicknamed the Wildcats. Both the College colors and the nickname were selected by popular vote of the students.

Athletics

The Williamsport Area Community College subscribes to the belief that well-balanced intramural and intercollegiate sports programs play an important role in the overall purpose of an educational institution and sponsors these activities as an integral part of its educational program.

Intramurals

Intramurals provide an opportunity for all students to participate in active competition, to improve physical strength and skill, to pursue beneficial leisure time activities, and to develop friendships. The Physical Education Department conducts a wide variety of intramural athletic leagues for men and women. These activities include touch football, soccer, basketball, volleyball, bowling, table tennis, wrestling, tennis, golf, track and field, softball, handball, horseshoes and others.

Intercollegiate Sports

The Intercollegiate Sports Program at The Willamsport Area Community College is under the direction of the Physical Education Department. At present, the College has a basketball team which is a member of the National Junior College Athletic Association. Other varsity sports will be added as facilities become available.

Social Events

The Student Council sponsors a series of dances and other social events during the school year.

Student Conduct

On admission to the college each student accepts an unqualified commitment to conduct himself at all times, both on and off the campus, in a responsible manner conforming with generally accepted standards of adult behavior. It is expected that The Williamsport Area Community College students will show common courtesy and respect for College officials, faculty and employees. They are expected to understand and accept College regulations and to respect the directives of those authorized to enforce regulations. Any student who conducts himself in a manner contrary to the best interest of the College will be subject to such penalties as the circumstances justify, including suspension or expulsion.

Housing

The College provides a housing office to assist students desiring residence accommodations.

Housing standards have been adopted and the rooming and boarding facilities must meet minimum requirements to be on the list of available housing for the College. Periodic inspections of all such facilities are made by the Head of Student Services. Copies of these standards and the list of available rooming and boarding facilities are available from the Student Activities Office.

Job Placement

Placement is not guaranteed upon completion of the curriculum; however, many opportunities for employment are available.

Many personnel directors from various industries contact the College for graduates.

All department chairman and the Deans of the various schools are continually looking for suitable positions for their graduates. The College feels it has an obligation to assist students to secure job offers in the particular fields in which they have been trained.

ADMISSIONS AND REGISTRATION

Educational Opportunities

A student enrolled in The Williamsport Area Community College may pursue a variety of educational programs. If he plans to earn a Baccalaureate degree, he may complete the first two years of college work at The Williamsport Area Community College, receive an Associate degree, and transfer to a four-year institution provided he meets the receiving institution's requirements. Another student may choose to prepare himself for a technical or semi-professional occupation. If that is his desire, he may pursue a series of studies in his chosen field, receive an Associate degree or a Certificate, and find employment in business, industry, or a service occupation.

Other students may wish to take courses to improve their background prior to enrolling in regular college work, or take courses for job advancement. Many times students will enroll in community college courses for cultural advancement or to satisfy individual interests.

Since The Williamsport Area Community College is flexible in its offerings and is committed to providing the courses and educational programs for which there is adequate demand in the region served by the College, a student may find at any given time a number of educational offerings of interest to him. The course offerings are listed prior to registration each semester and summer session. A copy of the appropiate schedule will be sent by the Admissions Office to a prospective student upon request.

Admission to the College

Anyone who wishes to further his education is welcome to apply for admission to The Williamsport Area Community College. Order of preference for admission will be given first to applicants from sponsor districts; second, to applicants from districts sponsoring other community colleges; third, to applicants from Pennsylvania school districts not sponsoring community colleges; and fourth, to out-of-state applicants or persons from other nations. No student will be denied admission because of race, creed, or national origin.

Admission to the College is contingent upon meeting the admission requirements of the particular program or field of study desired by the applicant.

Admission Procedure and Information

Application forms may be obtained by writing or calling the Admissions Office, The Williamsport Area Community College, 1005 West Fourth Street, Williamsport, Pennsylvania 17701. The telephone number is (717) 326-3761 extension 237.

An application should be submitted as early as possible but not

more than one year in advance of the date the candidate wishes to enroll.

If a student needs additional information or aid in selecting a course or program, he may arrange for a personal interview by writing or calling the Admissions Office at the address listed in the preceding paragraph. Requests for personal interviews should be made at least three weeks in advance of the date the interview is desired.

Applicants will be scheduled for testing and counseling as soon as possible after all of their credentials have been received. The length of time between the filing of the application and the scheduling for testing will vary according to the number of people to be tested and the course for which the candidate applied. Approximately four weeks after he has been tested the candidate will be notified whether or not he has been tentatively accepted. He will also receive a copy of his test scores.

At this time candidates who have been tentatively accepted will be sent a medical form to be completed by a physician. Final acceptance will be given after this medical form has been favorably reviewed by the College.

Transfer Student

Students seeking to transfer to The Williamsport Area Community College must submit an official transcript of the course work completed at the other college(s).

Work for which transfer credit is sought will be evaluated by The Williamsport Area Community College. A maximum of 30 credit hours may be transferred toward completing an Associate degree. The fourth semester must be completed at The Williamsport Area Community College.

If a student, after completing four semesters, lacks some credits required for a degree, he may, with approval of the Dean, be permitted to take up to six semester credit hours from another college to fulfill requirements for the Associate degree from The Williamsport Area Community College. Such credits shall be for courses where grades are C or better.

Transfer of Credit

Credit earned in the college-parallel transfer programs of The Williamsport Area Community College is transferable to the four-year institution of the student's choice as long as the student has met the requirements of the receiving institution. It is for this reason that students who select a transfer program are counseled to pursue in the College the courses stipulated for freshmen and sophomores in the institutions from which they intend to receive the baccalaureate degree. The responsibility to determine whether the student meets the admission requirements of the college to which he intends to transfer rests with the student.

A grade-point average of 2.50 will be required for transfer recommendation to another college.

Counseling and Guidance

A major role of the community college is to assist the student in making the often difficult transition from high school to the more rigorous demands of college study. The College maintains a full time guidance staff for this purpose. It offers its services to any applicant for as long as is needed to accomplish an attainable goal for him. It also is concerned with the student's progress towards that goal while enrolled in the college

All applicants for admission to full-time courses will be tested for strengths and weaknesses as well as for ability to meet entrance requirements of the desired course or curriculum. All students will be counseled and guided according to their respective aptitudes, abilities, and interests.

Applicants should report for testing at the time requested by the Admissions Office. Upon the completion of testing, a counselor will discuss the applicant's educational and vocational goals, and assist him in planning an appropriate educational program.

Vocational Diagnostic Program

Individuals requiring intensive vocational counseling in areas other than liberal arts may take advantage of the three-week vocational diagnostic program offered approximately ten times during the school year. This program is designed to assist students in career selection through aptitude testing, individual counseling, extensive vocational information and actual job trials in the various departments.

This service is available to any individual whether or not he plans to attend the College. For fees and additional information write:

Vocational Diagnostic Department
The Williamsport Area Community College
or phone Williamsport (717) 326-3761, Ext. 212.

Registrations

Students must register in person on the dates specified in the College Calendar. Students whose registrations are not completed, including payment of all required fees, during the days specified as registration days, will be charged a late registration fee of $10.

TUITION AND FEES*

Registration Fee $10.00

A non-refundable registration fee (required to be paid only once) must accompany the application.

Tuition Deposit $25.00

A $25.00 deposit on the first semester's tuition is required for all full time students within the time period specified in the notice of registration date. If the tuition deposit is not received within the time stipulated, the college may assign the student's place to another applicant.

Tuition and Fees

The tuition and fees for a 16 week semester are as follows:

	Resident of Sponsor District	*Resident of Non-sponsor District*	*Out of State Resident*
Tuition	$150.00	$300.00	$450.00
Service Fee	None	56.00	112.00
Activity Fee	5.00	5.00	5.00
Total	$155.00	$361.00	$567.00

An applicant who is a resident of a sponsor district of The Williamsport Area Community College, after being notified that he has been accepted, must have the secretary of his local school board complete a resident tuition form in order to be eligible for sponsor district tuition rates. This form should be mailed to the Business Office of the College as soon as possible.

An applicant who is a resident of a district which is a sponsor of some other community college must obtain permission from the board of trustees of that particular college at least 60 days prior to date of enrollment in order to qualify for sponsor district tuition. If this permission has not been obtained in writing, it will be necessary for the applicant to pay the same tuition as out-of-state residents. If permission is obtained, tuition and fees will be:

Tuition	$150.00
Service Fee	56.00
Activity Fee	5.00
Total	$211.00

*Charges are subject to change at any time without prior notification.

The Tuition and Fees in the School of Continuing Education are as follows:

	Per credit hour
Students from sponsor districts	$12.50
Students from non-sponsor districts	25.00
Out-of-state residents	37.50

Laboratory fees will be charged where they apply.

Withdrawals and Refunds

Charges for tuition are refundable upon withdrawal from the College only if the student obtains an official withdrawal form from the Dean of his school and presents it to the Business Office.

Refunds of tuition will be made according to the following schedule:

1st week of classes	80% Refund
2nd week of classes	70% Refund
3rd week of classes	60% Refund

No refunds will be made after the third week of classes.

Registration, activity, and service fees are not refundable.

Room and Board

For those students who require living facilities, the average cost of room and board for a 16 week semester is $420. The college does not yet maintain its own housing facilities. To assist the student in making private arrangements, a list of available facilities will be mailed after the registration deposit has been received.

Books and Tools

All textbooks must be purchased by the student. Since it is the policy of the school to keep the student's expenses as low as possible, a school bookstore is operated on a cost basis.

All special and large tools will be supplied by the College. A list of required tools will be furnished by the instructors. Only personal tools required in the respective shops and laboratories must be purchased by the student.

FINANCIAL AID

Scholarships

Pennsylvania Higher Education Assistance Agency Scholarship

The Pennsylvania Higher Education Assistance Agency awards scholarships to students based upon academic achievement and financial need. There are three main types of scholarship awards as follows:

Group I--Academic Scholarships. High school seniors entering two year associate degree college transfer programs at The Williamsport Area Community College must compete on the Scholastic Aptitude Test of the College Entrance Examinations Board for these scholarships. Selection of students to receive Group I awards will be made following receipt of the applications and will be based upon test score, rank in high school class, available state funds and need for financial assistance as determined by the Pennsylvania Higher Education Assistance Agency.

Group II--Students who are enrolled or plan to enroll in an approved course of study in any trade, technical or business school within the Commonwealth of Pennsylvania may apply for a scholarship in Group II when they have been accepted for enrollment, but not prior to high school graduation. The course of study must offer at least 1800 clock hours of instruction on a full-time basis, require a high school diploma for admission, and be a course of study approved by the Higher Education Assistance Agency under the State Scholarship Program. The students may obtain an application from their high school or The Williamsport Area Community College.

Other Freshman Financial Need Scholarships: Incoming freshmen are eligible to receive Group II financial need scholarships. These awards are made on the basis of the student's need for financial assistance, an SAT total score of 800 or higher and his ability to successfully complete the course of study for which he is enrolled.

Group III--Special Freshmen and Upper Class Scholarships. Students enrolled in the sophomore year or students who enter the freshmen class with a lapse of at least one year between high school graduation and college enrollment within the Commonwealth of Pennsylvania may be considered for a Group III award. The financial aid officer at The Williamsport Area Community College will recommend students to the Pennsylvania Higher Education Assistance Agency for these awards on the basis of financial need and availability of Group III funds. These awards may be renewed from the freshman to the sophomore year upon the recommendation of the college.

Applications for Group II and Group III scholarships may be obtained from high schools, the college Financial Aids Office, or the Pennsylvania Higher Education Assistance Agency in Harrisburg.

Sylvania Electric Products, Inc. Scholarships for York County Residents

The Sylvania Electric Products of York, Pennsylvania has estab-

lished two $1,000 Scholarships to be awarded to graduating seniors from any of the York County High Schools who are interested in obtaining additional education in machine trades subjects. Scholarship applications may be secured at the guidance office of any York County High School.

Loans

Pennsylvania Higher Education Assistance Agency-Federal Guaranty Loan Program

The Pennsylvania Higher Education Assistance Agency administers the Federal Guaranty Loan Program. This program enables residents of Pennsylvania to borrow up to $1,000 per academic year from approved lending institutions in Pennsylvania to meet educational expenses. The student pays no interest on the loan until after graduation or withdrawal from the College, after which he must pay three percent interest during the repayment period.

After the student graduates from high school, he should contact a local participating lending institution to initiate an application for a loan.

The G. Walter Smith Jr. Loan Fund

This loan fund was established in the memory of G. Walter Smith Jr.

Students who have attended the college for at least two semesters may apply for loans from this fund. Information and applications may be obtained from the financial aid officer at the school.

Educational Assistance for Veterans

The Williamsport Area Community College is an accredited college for the education of veterans as authorized by Public Laws 634, 815, 894, and 358.

A veteran who has served continuously on active duty for a period of at least 181 days, any part of which was after January 31, 1955, and who was discharged or released under conditions other than dishonorable, or any veteran who has served less than 181 days may be eligible if he was discharged or released because of service-connected disability.

Veterans may apply to the Veterans Administration Office for education or training under this program. Additional information may be obtained by writing to the Veterans Administration Office in Philadelphia, Pennsylvania. Applications are available at the Director of Admissions Office.

Social Security Educational Assistance

The social security law provides monthly benefits to children when a parent on whom they were dependent dies or starts receiving social security retirement or disability benefits.

The payments can be made until age 22, without regard to disability, provided the child is a full-time student in an educational institution.

Vocational Rehabilitation Assistance

Financial assistance in varying proportions is available through the office of Vocational Rehabilitation for applicants who may be under a disability. For further information concerning this program inquiries should be directed to the office of Vocational Rehabilitation at the College.

Part-Time Employment

While no promises can be made as to part-time employment because of changing times and conditions, there are part-time jobs available from time to time. A list of such part-time jobs is maintained in the Student Activities Office.

Gifts to the College

Gifts to The Williamsport Area Community College are tax deductible. It is hoped that individuals, business and industrial organizations, labor unions and other local and area organizations will make contributions to further the aims and objectives of the College.

Opportunities for supporting higher education through a gift or bequest to The Williamsport Area Community College can be arranged through the office of the President of the College.

ACADEMIC REGULATIONS

School of Liberal Arts and Sciences - Associate Degree

For students planning to transfer to a four-year college or university.
For students who will complete their college work with the attainment of the Associate in Arts degree or Associate in Science degree.
For students planning to continue training in occupational fields that have as their prerequisite two years of college.

To be admitted to the School of Liberal Arts and Sciences, applicants must present evidence of graduation from an accredited high school; or, in the event they have not completed a regular high school program, they may qualify scholastically on the basis of equivalency examinations administered by the College or other recognized educational agencies. Admission to this School implies the assumption that the student possesses the potential to do satisfactory work at the college level and to achieve a baccalaureate degree in the various colleges where he may seek to transfer credits.

A candidate for admission must submit to the Admissions Office:

1. An application form (available from the Admissions Office)
2. A check or money order for $10 (non-refundable registration fee)
3. A transcript of his high school work
4. A recommendation from his high school principal or guidance counselor evaluating the applicant's character and potential for successful college work
5. Scores from Scholastic Aptitude Tests (SAT) or American College Test (ACT)
6. A medical form (which will not be required until the applicant is accepted)

A candidate must obtain satisfactory scores on a series of tests which will be administered by the College.

School of Applied Arts and Sciences - Associate Degree

For students interested in two-year semi-professional and technical career programs.
To be admitted to the School of Applied Arts and Sciences, the applicant must be a high school graduate or equivalent.
A candidate for admission must submit to the Admissions Office:

1. An application form (availible from the Admissions Office)
2. A check or money order for $10 (non-refundable registration fee)
3. A transcript of his high school work
4. A recommendation from his high school principal or guidance counselor evaluating the applicant's character and potential for successful college work
5. A medical form (which will not be required until the applicant is accepted)

A candidate must obtain satisfactory scores on a series of tests which will be administered by the College.

School of Applied Arts and Sciences - Certificate Programs

Admission to occupational certificate programs is based on general ability for the program desired as shown by tests which will be administered by the College.

A candidate for admission must submit to the Admissions Office:

1. An application form (available from the Admissions Office)
2. A check or money order for $10 (non-refundable registration fee)
3. A medical form (which will not be required until the applicant is accepted)

A candidate must obtain satisfactory scores on a series of entrance tests which will be administered by the College.

School of Continuing Education

To meet the educational and cultural needs of the community, The Williamsport Area Community College, in its School of Continuing Education, presents a variety of course offerings from the School of Liberal Arts and Sciences and the School of Applied Arts and Sciences.

Any person who has completed high school or who has left school may enroll in the School of Continuing Education for one or more evening courses, depending on his individual needs or desires.

The College offers courses for students earning credits toward an Associate degree or the first two years of a baccalaureate degree program.

In addition, the College offers courses to upgrade and retrain industrial employees, classes to improve the skills and general competency of men and women engaged in business or professional fields, cultural programs, and courses or workshops desired by groups who wish to explore a subject for the sheer pleasure of learning something new. Special programs may be instituted for business, industry, professional organizations, unions, and others, for apprenticeship training or such other specialized training as is required.

Bulletins announcing course offerings, registration dates and other requirements may be obtained in advance of each semester from the Dean of the School of Continuing Education.

Summer Session

The College offers an eight-week summer term, the dates of which are indicated in the College Calendar. The summer session may be attended by both The Williamsport Area Community College students and students from other institutions who wish to earn additional credits during the vacation period. It is also open to students who may wish to enroll for cultural advancement or to satisfy individual interests.

Courses are available in the School of Liberal Arts and Sciences for students earning credits toward an Associate degree or the first two years of a baccalaureate degree program. Courses are available in the School of Applied Arts and Sciences for students earning credits for an Associate degree or for a Certificate.

Attendance at the summer session permits full-time students to complete an approved course of study in a shorter time.

Refresher courses and other review courses are among the subjects offered. Programs of remedial studies are also available for those who are deficient in a subject.

Bulletins announcing course offerings, registration dates and other requirements may be obtained in advance of the session from the Dean of the School of Continuing Education.

Application forms may be obtained by writing or calling the Admissions Office, The Williamsport Area Community College, 1005 West Third Street, Williamsport, Pennsylvania 17701. The telephone number is (717) 326-3761, extension 237.

Advanced Placement and Credit

The Williamsport Area Community College recognizes advanced achievement in secondary schools by granting to qualified students college credit for such work accomplished up to a maximum of 15 credit hours. The freshman who receives this credit may enroll for advanced placement in the subject areas in which he has received the advanced placement or may elect courses in other subjects. This plan provides the opportunity to begin college work at a higher level, and it shortens the time required to complete work for the Associate degree.

A student's eligibility to receive advanced placement and credit in the School of Liberal Arts and Sciences will be determined by his performance on Advanced Placement tests and the Scholastic Aptitude Tests (College Boards). Eligibility for advanced placement and credit in the School of Applied Arts and Sciences will be determined by examination administered with the approval of the Dean of that School.

In all applications for advanced placement and credit, the appropriate Dean and Department Chairman will consider additional information including the quality of the student's work in his secondary schooling. In all instances, the credit given will be in terms of courses corresponding to those courses which are part of the regular curriculum of the College.

Credit and Credit Load

The academic year is divided into two semesters of approximately 16 weeks each. The normal load per semester is 15 to 18 semester hours. A semester hour is, generally, equivalent to one hour per week of lecture or two hours per week of laboratory work. Students should allow an average of two hours of preparation for each semester hour of course work.

A student may not enroll for more than 18 semester-hours without special permission from the Dean of his respective School.

Grading System

The College uses the following system of grading (4.00 basis) to indicate on its records the quality of a student's work:

Grade	*Interpretation*	*Grade Points Per Semester Hour*
A	Superior	4
B	Above Average	3
C	Average	2
D	Below Average	1
F	Failing Work	0
W	Official withdrawal before the end of six weeks	
WF	Withdrawal with failure	
I	Incomplete (Student must arrange with instructor to complete work before the end of the next semester)	

A student's grade-point average is computed by dividing the number of his grade points by the total number of hours for which he has earned a grade of A, B, C, D, or F.

A grade-point average of 2.00 will be required for graduation with an Associate degree granted by the School of Liberal Arts and Science or by the School of Applied Arts and Sciences.

The College will notify by mail the parents of all full-time students who have received D or F in any subject at mid-semester. Students who have received such grades must immediately consult their instructors as to how they may improve the quality of their work. A grade reported as INCOMPLETE at the end of a semester will be permanently recorded an F if the incomplete is not removed within the following semester.

Scholastic Requirements

Any student whose grade-point average for any given semester is below 1.50 will be placed on academic probation. The student will be required to report to the Dean of his respective school for special counseling before being allowed to register for classes the following semester. After interviews with the Dean, adjustment will be made in his academic load and he will be expected to achieve a grade-point average of 2.00 or above for the succeeding semester. To be removed from probation and to achieve good academic standing, a student is expected to accumulate a grade-point average as follows:

Beginning of	*Cumulative Grade-Point Average*
Second Semester	1.50
Third Semester	1.80
Fourth Semester	1.90

Students are encouraged to seek consultation on academic matters with the Deans of the respective Schools.

It is the prerogative of the Deans of the Schools to drop a student from the College at any time or to place a student on warning for one semester or longer.

Grade Reports

Reports of unsatisfactory academic progress will be mailed to all students (and/or parents) at the end of the first eight weeks of every semester. Final semester grades will be mailed within one week after the end of the semester or the summer session.

The Dean's Honor List

The honor list for each School is anounced by the Dean of the respective School at the completion of each semester. This list will include only those students carrying twelve credit-hours or more who have a grade-point average of 3.30 or better.

Attendance Regulations

Regular and prompt attendance at all classes and at scheduled conferences with instructors is expected of all students. All work missed by reason of absence, regardless of the cause, must be made up to the satisfaction of the instructor. A student who knows that he will be absent is expected to get assignments from his instructors in advance so that the necessary work will be completed before he leaves or immediately upon his return. This applies to absences for college activity trips as well as absences for other reasons. In all cases of anticipated absence, the student should confer with his instructor in advance whenever possible.

Students are expected to be in the classroom or laboratory at the scheduled hour. Habitual tardiness may be considered cause for dismissal from the class.

Special Courses

Certificates will be awarded for satisfactory completion of courses designed to meet the individual needs of students. These courses depart somewhat from the sequence, hours, and credits normally required. Students enrolled in such programs are classified as special students.

Credit by Examination - Registered Students

Registered students may earn credit by examination and receive a grade, when such procedure is approved by a department and by the Dean of the School concerned. Application for such examinations must be made at the time of registration for each semester on a form obtainable from the Registrar. Approval must then be given by the chairman of the department concerned and by the Dean of the School. If approval is given, a fee of $25 is to be paid for each examination. The examination is to be taken at a time appointed by the Committee on Schedules. Such examinations may not be used to overcome an F grade.

A maximum of 15 credits may be earned by examination in addition to the 15 credits maximum under "Advanced Placement and Credit".

A grade of F on a special examination will not be recorded on the permanent record. The faculty is not expected to assist any student preparing for an examination.

Dropping a Course

A student may drop a course any time before the last two weeks of a semester by completing an official "Change of Roster" form. A course dropped before the end of six weeks is recorded with a W grade. A course dropped after the end of six weeks is a recorded grade of WF. No credit is given for a W grade. A grade of WF affects a student's grade point average in the same manner as an F. A course dropped after six weeks may be recorded as a W upon recommendation of the instructor and the Dean.

Classification of Students

Freshman Class - Students with fewer than 30 semester hours of credit are members of the freshman class.

Sophomore Class - Students with at least 30 semester hours of credit are members of the sophomore class.

Withdrawal by Request

The student who continues to be habitually absent from class without good reason will be asked to withdraw from the class by the Dean of his School if, in the opinion of the instructor, further participation in the class seems to be of little value to the student and detrimental to the best interests of the class. Poor work because of a lack of effort and interest shall be just cause for withdrawal by request from the College.

Students who are found to be under the influence of, or in possession of alcoholic beverages may be dismissed from the College.

In all cases where academic dishonesty is established, the student will be dropped from the course with a grade of F. For a second offense, he may be dismissed from the College. In a case involving a question of academic dishonesty, the professor in whose class the alleged incident is said to have occurred, will consult with the Dean regarding appropriate disciplinary action.

Withdrawal from College

If a student finds it necessary to withdraw from the College, he should report to the Dean of his respective School and complete the necessary forms in order to make the withdrawal official. If a student leaves without withdrawing officially, he will be given the grade of WF in all subjects.

Graduation Requirements

1. The successful completion of a prescribed two-year program of study at The Williamsport Area Community College leads to an Associate in Arts degree or an Associate in Science degree, both granted by the School of Liberal Arts and Sciences. An Associate in Applied Arts degree or an Associate in Applied Science degree is granted by the School of Applied Arts and Sciences.

   To be eligible for a degree from The Williamsport Area

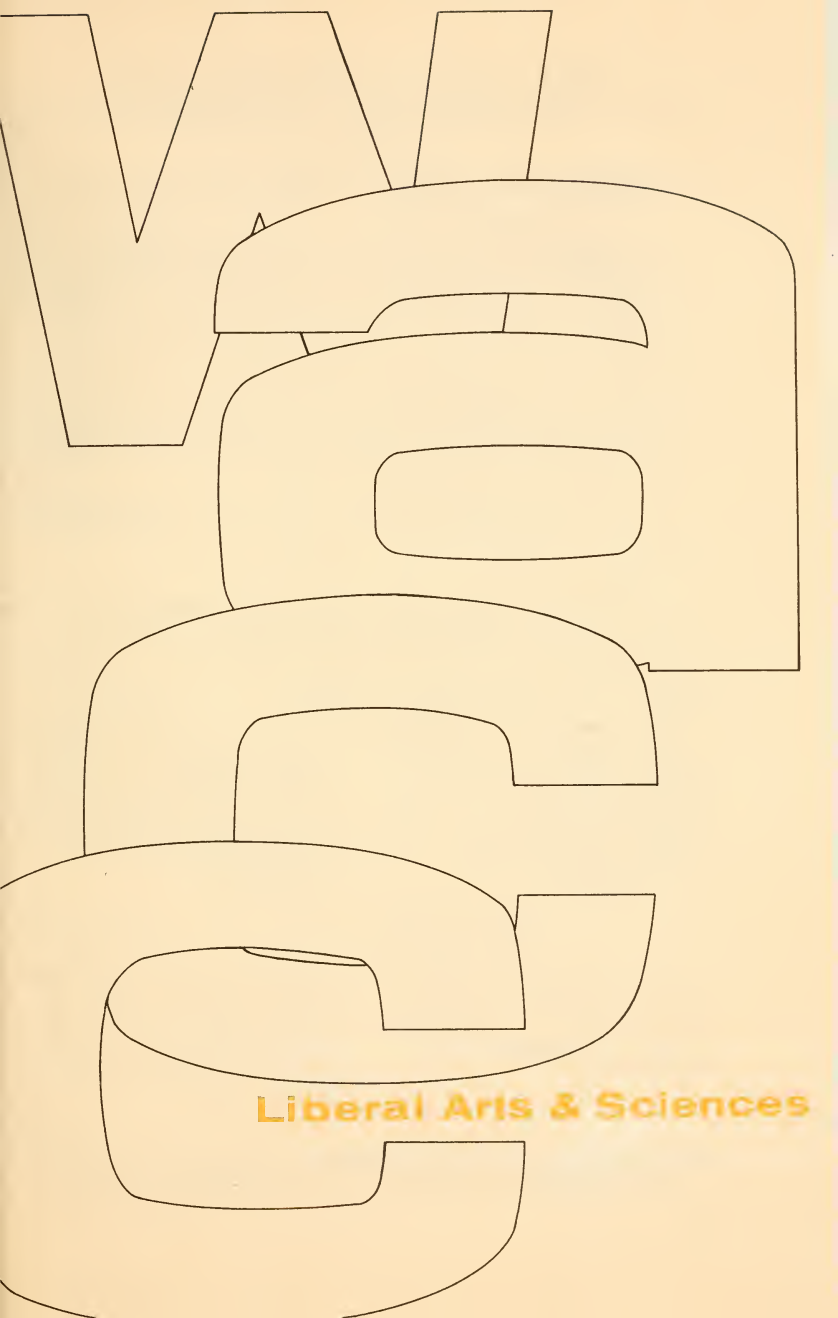
Community College the student is expected to satisfy the following:

a. Complete no less than 60 semester hours (in addition to physical education) in a planned program of study
b. Earn at least a C average (2.00) grade-point average
c. Satisfy health and physical education requirements
d. Fulfill all financial obligations to the College
e. Satisfy all admission requirements
f. Complete a minimum of one year (30 semester hours) at The Williamsport Area Community College. The fourth semester must be completed at the College.

2. Certificates will be awarded for the satisfactory completion of certain courses or the satisfactory completion of a series of courses designed for a specific purpose.

Commencement Awards

1. Leadership and service as demonstrated in the college community.
2. Scholastic proficiency in liberal arts and sciences
3. Scholastic proficiency in applied arts and sciences
4. Achievement award for the outstanding student in non-degree programs


Liberal Arts & Sciences

THE WILLIAMSPORT AREA COMMUNITY COLLEGE

SCHOOL OF LIBERAL ARTS AND SCIENCES

This program is a two-year college transfer program. It is designed for those students who wish to work toward a degree at a four-year college after they have completed their work at the Community College. The responsibility to determine whether the college to which the student intends to transfer will accept these credits and as to whether the student can meet the admission requirements rests with the student. We suggest that each applicant determine before he enrolls in the program to what college or colleges he desires to transfer credits.

Graduates from this program will receive an Associate in Arts or an Associate in Science Degree.

LIBERAL ARTS AND SCIENCES—ASSOCIATE DEGREE PROGRAM

For students seeking to transfer credits toward Bachelor of Arts degree or Bachelor of Science degree (Mathematics-Science).

General Requirements

First Semester	*Credits*	*Second Semester*	*Credits*
English (Composition)	3	English (Composition)	3
History (World)	3	History (World)	3
Lab. Science (°or Math.)	3– 4	Lab. Science (°or Math.)	3– 4
Foreign Language	3– 4	Foreign Language	3– 4
Elective (Psychology, Sociology or Economics)	3	Elective (Philosophy or Government)	3
Physical Education	1	Physical Education	1
	16–18		16–18

Third Semester	*Credits*	*Fourth Semester*	*Credits*
English (Literature)	3	English (Literature)	3
Lab. Science (°or Math.)	3– 4	Lab. Science (°or Math.)	3– 4
Foreign Language	3	Foreign Language	3
Elective—Social Studies	6	Philosophy	3
Physical Education	1	Elective—Social Studies	3
		Physical Education	1
	16–17		16–17

° Required—2 years Laboratory Science or 1 year Laboratory Science and 1 year Mathematics above Mathematics 100.

For students seeking to transfer credits toward Bachelor of Science in Business Administration.

General Requirements

First Semester	*Credits*	*Second Semester*	*Credits*
Elective	3	Economics	3
English (Composition)	3	English (Composition)	3
History (World)	3	History (World)	3
Mathematics (College Algebra)	3	Mathematics (Trigonometry)	3
Economics	3	Elective	3
Physical Education	1	Physical Education	1
	16		16

Third Semester	*Credits*	*Fourth Semester*	*Credits*
English (Literature)	3	English (Literature)	3
Mathematics or Laboratory Science	3 or 4	Mathematics or Laboratory Science	3 or 4
History (U. S.)	3	Statistics	3
Electives	3	History (U. S.)	3
Accounting	3	Accounting	3
Physical Education	1	Physical Education	1
	16 or 17		16 or 17

For students seeking to transfer credits toward Bachelor of Science degree in Education.

General Requirements

First Semester	*Credits*	*Second Semester*	*Credits*
English (Compositon)	3	English (Compositon)	3
°Mathematics 100	3	History (U. S., including Pa.)	3
History (U. S., including Pa.)	3	Electives (Humanities or Social Studies)	9
General Psychology	3	Physical Education	1
Elective (Economics or Sociology)	3		16
Physical Education	1		
	16		

Third Semester	*Credits*	*Fourth Semester*	*Credits*
English (Literature)	3	English (Literature)	3
°°Mathematics or Laboratory Science	3 or 4	°°Mathematics or Laboratory Science	3 or 4
History of Education or Philosophy of Education	3	Educational Psychology	3
Electives	6	Electives	6
Physical Education	1	Physical Education	1
	16 or 17		16 or 17

° Mathematics 100 is designed for students other than those preparing to teach in the fields of Mathematics or Science. Students preparing to teach Mathematics or Science will be required to take Mathematics courses numbered above 100.

°° Statistics elective.

For students seeking to transfer credits toward Bachelor of Science in Engineering.*

General Requirements

First Semester	*Cr.*
English (Composition)	3
Mathematics (Calculus I) (5 periods 1 week)	4
Chemistry (General Chemistry) or Physics	4
Electives (Social Studies or Humanities)	6
Physical Education	1
	18

Second Semester	*Cr.*
English (Composition)	3
Mathematics (Calculus II) (5 periods 1 week)	4
Chemistry (General Chemistry) or Physics	4
Electives (Social Studies or Humanities)	3
Engineering Graphics	3
Physical Education	1
	18

Third Semester	*Cr.*
Chemistry (General Chemistry) or Physics	4
Physics	3
Mathematics (Calculus III)	4
Economics	3
Engineering Subjects (as required)	3
Mechanics	
Surveying	
Materials	
Computers and Engineering Analysis	
Thermodynamics	
Electrical Circuits	
Elective (Social Studies or Humanities)	3
Physical Education	1
	18

Fourth Semester	*Cr.*
Chemistry (General Chemistry) or Physics	4
Mathematics (Differential Eq.)	3
Engineering Subjects (as required)	6
Elective (Social Studies or Humanities)	3
Physical Education	1
	17

* During 1966-67, Sophomores will take Calculus III first semester and Calculus IV and Differential Equations second semester, all allowing three credit hours.

SCHOOL OF LIBERAL ARTS AND SCIENCES

COURSE CREDIT

The semester hour is the unit of credit. Except for laboratory work, hours of credit are usually evaluated in terms of the hours that the class meets each week and by the scope and depth of the study. Sixty credit hours, exclusive of Physical Education, are required for an Associate Degree in Liberal Arts and Sciences.

COURSES OF STUDY

Courses numbered in the 100 series are generally taken the first year; in the 200 series, the second year.

Within the parenthesis following the course title, "I" indicates first semester; "II," second semester. The number after the semicolon shows the number of credit hours for each course.

Accounting

201. PRINCIPLES OF ACCOUNTING (I;3)
Fundamental theory. Recording, classifying, summarizing and interpreting business activity through accounting.

202. INTERMEDIATE ACCOUNTING (II;3)
Current concepts and standards. Analysis and interpretation of financial position of business organizations. Prerequisite: Accounting 201.

Education

201. HISTORY AND PHILOSOPHY OF EDUCATION (I;3)
Foundations of education: Historical, economic, philosophical and social. Their implications for present-day education.

202. EDUCATIONAL PSYCHOLOGY (II;3)
Psychological principles and concepts applied to learning. Individual differences, motivation and emotion in learning. Prerequisite: Psychology 101.-102.

Engineering

Courses will be offered in 1966-67, and thereafter, to complete Freshman and Sophomore requirements for Engineering students. These include, in addition to required work in Mathematics, Science, Social Studies, English and the Humanities, (°):

Engineering Graphics	3
Mechanics	3–5
Surveying	3
Materials	3
Computers and Engineering Analysis	3
Thermodynamics	3
Electrical Circuits	3

English and Speech

101. COMPOSITION AND LITERATURE (I;3)
Practice in expository writing; study of rhetorical principles based on readings in expository prose and the use of a standard text.

102. COMPOSITION AND LITERATURE (II;3)
Continuation of English 101; study of four American novels.

201. HISTORY OF ENGLISH LITERATURE (I;3)
A survey of English Literature from *Beowulf* to *Lyrical Ballads;* selected readings.

202. HISTORY OF ENGLISH LITERATURE (II;3)
A survey of English Literature from *Lyrical Ballads* through Auden; selected readings.

211. SPEECH (II;3)
Principles and practice of public speaking. The art of good speech. Criticism of selected speeches.

(°) See "Liberal Arts and Sciences—Associate Degree Program" for students seeking to transfer credits toward a Bachelor of Science Degree in Engineering.

HUMANITIES

History

101. WORLD (I;3)
Development of ideas, values, institutions and cultures. Major trends and factors from ancient times to the 18th century including analysis of the development of cultural problems and ideas.

102. WORLD (II;3)
Continuation of History 101; 18th century to the present.

201. THE UNITED STATES, INCLUDING PENNSYLVANIA (I;3)
Political, economic, and social development of the United States, including Pennsylvania, from pre-colonial and colonial times, to, and including, the Civil War period.

202. THE UNITED STATES, INCLUDING PENNSYLVANIA (II;3)
Continuation of History 201; The United States from 1865 to the present.

Philosophy

101. INTRODUCTION TO PHILOSOPHY (I;3)
The nature and function of Philosophy. Methods of philosophical inquiry.

102. LOGIC (II;3)
Logical method. Principles and techniques of sound reasoning. Inductive and deductive processes.

Mathematics

100. FUNDAMENTALS OF MATHEMATICS (I;3)
Fundamental mathematical thinking. Reasoning in mathematics, sets, logic, structure of mathematical systems, functions, geometry and trigonometry, permutations, combinations and probability. Prerequisite: Two units of high school mathematics.

101. COLLEGE ALGEBRA (I;3)
Review of fundamentals of algebra, linear functions, exponents and radicals, quadratic equations, ratio and proportion, probability, mathematical induction, binomial theorem, inequalities, complex numbers, theory of equations and determinants. Prerequisite: Intermediate Algebra and Plane Geometry.

102. COLLEGE TRIGONOMETRY (II;3)
The trigonometric functions, use of tables, solution of right and oblique triangles, radian measure, fundamental identities, graphical representation of trigonometric functions, inverse functions and solution of equations. Prerequisite: College Algebra.

105. CALCULUS I (I;3)
Elements of analytic geometry. Derivatives, antiderivatives, applications; vectors, lines and conics. Prerequisite: College Algebra and Trigonometry.

106. CALCULUS II (II;3)
Integration, transcendental functions, parametric equations, polar coordinates. Prerequisite: Calculus I.

201. STATISTICAL ANALYSIS (I;3)
Basic concepts of probability and introduction to statistical inference. Applications of the binomial distribution, normal distribution, linear regression and correlation. Prerequisite: College Algebra.

202. STATISTICAL ANALYSIS (II;3)
Presentation of statistical techniques and the physical situations to which they apply; Student's T, Chi-Square, and F tests. Linear models for experimental situations; multiple regression and correlation. Prerequisite: Math 201.

205. CALCULUS III (I;3)
Solid analytic geometry, elements of infinite series, and partial differentiation. Prerequisite: Calculus II.

206. CALCULUS IV (II;3)
Differential Equations: An introductory study with applications to physics, chemistry, and engineering. Prerequisite: Calculus III.

MODERN LANGUAGES

French

101.-102. BEGINNING FRENCH (I;4:II;4)
Grammar basis with structural analysis. Comprehension, speaking, and reading, with particular regard to pronunciation and accent will be stressed.

201.-202. INTERMEDIATE FRENCH (I;3:II;3)
Review of grammar, with readings on the intermediate level. Purpose—to perfect a command of the language.

German

101.-102. BEGINNING GERMAN (I;4:II;4)
Grammar basis with structural analysis. Comprehension, speaking and reading with particular regard to pronunciation and accent will be stressed.

201.-202. INTERMEDIATE GERMAN (I;3:II;3)
Review of Grammar, with readings on the intermediate level. Intended to increase practical command of the language.

Spanish

101.-102. BEGINNING SPANISH (I;4:II;4)
Grammar basis with structural analysis. Comprehension, speaking and reading with particular regard to pronunciation and accent will be stressed.

201.-202. INTERMEDIATE SPANISH (I;3:II;3)
Review of Grammar, with exercises in the Spanish Subjunctive. Readings on the intermediate level. Intended to develop greater command of the language.

PHYSICAL EDUCATION

Physical Education is required of both men and women during each semester. All new students are required to submit a medical report before enrollment. Health instruction is included for both men and women.

101., 102., 103. and 104. (MEN) (I;1:II;1)
Activities in addition to Health Instruction: Volleyball, basketball, wrestling, golf, badminton, softball, cageball, physical conditioning, touch football; also, Sports Appreciation.

101., 102., 103. and 104. (WOMEN) (I;1:II;1)
Activities in addition to Health Instruction: Volleyball, cageball, basketball, badminton, golf, swimming, softball, physical conditioning, shuffleboard and table tennis; also, Sports Appreciation.

SCIENCE

Biology

101.-102. GENERAL BIOLOGY (I;4:II;4)
An introduction to the study of the fundamental processes of living organisms; the main concepts of Biology are developed in a logical sequence beginning with a consideration of the chemical basis of life. The structure, function, interrelationships and evolution of organisms. Lecture and laboratory.

201. MICROBIOLOGY (I;4)
An introduction to the biology of microorganisms including bacteria, rickettsiae, viruses, fungi, protozoa, and helminths. The relationships between microorganisms and higher forms of life are studied. Lecture and laboratory. Prerequisites: General Biology and General Chemistry or equivalents.

210. GENERAL BOTANY (II;3)
An introductory study to plants, plant physiology, plant life cycles, and plant taxonomy. Lecture, laboratory, and field trips. Prerequisites: General Biology and General Chemistry.

Chemistry

101.-102. GENERAL CHEMISTRY (I;4:II;4)
A study of the theories and principles necessary for an understanding of the structure of matter; of chemical action involving the common elements and their compounds and basic chemical calculations.

201.-202. ORGANIC CHEMISTRY (I;4:II;4)
The study of the principal classes of organic compounds and their reactions. Emphasis will be placed upon structure, reactivity and mechanisms of reactions. Lecture and laboratory.

205. INORGANIC CHEMISTRY (I;3)
Atomic structure, chemical equilibrium, qualitative analysis, fundamental laws, principles and theories of chemistry, as well as descriptive inorganic chemistry of those elements not normally covered in high school. Prerequisite: Chemistry 201.

206. INORGANIC CHEMISTRY (II;3)
The chemistry of inorganic and metal organic coordination compounds in the light of modern theory. Prerequisite: Chemistry 205.

207. ANALYTICAL CHEMISTRY (I;3)
The analysis of special material, including organic and inorganic substances, utilizing instrumental methods. Prerequisite: Chemistry 205.

Geography

101. PHYSICAL GEOGRAPHY (II;3)
Origin, development and usage of maps and charts; topographic landforms; major lineaments of the earth's crust; temperature, humidity and precipitation; the oceans; atmospheric prameters; global climates; classification and properties of soils; and mineral and water resources. No laboratory is presented as the necessary maps and/or charts are considered in conjunction with the respective lecture(s).

Geology

101. PHYSICAL GEOLOGY (II;3)
The study of igneous, sedimentary and metamorphic rocks, earthquakes and the earth's interior; soils; erosional processes; streams; glaciation; the oceans; ground water; land forms and structure; and topographic and geologic maps. Laboratory: Rock and mineral identification; experiments in erosional and depositional processes; topographic and geologic map interpretation; and field inspection trips.

Physics

101. INTRODUCTORY PHYSICS (I;4)
A qualitative course suitable for arts college students interested in physical science. It covers the conventional areas of mechanics, sound and heat. Prerequisite: A working knowledge of high school algebra and trigonometry.

102. INTRODUCTORY PHYSICS (II;4)
A continuation of Physics 101 covering light, electricity, electronics, atomic physics, and nuclear physics. Prerequisite: Physics 101.

105. INTERMEDIATE PHYSICS (I;4)
A quantitative course in mechanics, heat, and sound designed for college students in science and engineering so that they may understand the important principles that are the foundations of further work in science and technology. Differential and integral calculus are used whenever this method is more direct and natural than the numerical and algebraic methods. Prerequisite: High School Physics. Corequisite: Math 105.

106. INTERMEDIATE PHYSICS (II;4)
A continuation of Physics 105, covering optics, electricity, and magnetism. Prerequisite: Physics 105. Corequisite: Math 106.

205. WAVE PHYSICS (I;4)
An examination and comparison of the various types of waves used in physics. Wave motion, acoustic waves, thermal radiation, electromagnetic radiation, radioactive radiation. Prerequisite: Physics 106. Corequisite: Math 205.

211. MODERN PHYSICS (II;4)
Atomic and Nuclear Physics. Structures of the atom and nucleus. Radioactivity. Fission and fusion. Relativity. Periodic table of the elements. Prerequisite: Physics 106. Corequisite: Math 211.

SOCIAL SCIENCES

Economics

201. INTRODUCTION AND ANALYSIS (I;3)
Economic concepts, principles and institutions. Methods of analysis.

202. PROBLEMS AND ANALYSIS (II;3)
A logical continuation of Economics 201. Emphasis on economic theory as applied to current economic problems. Prerequisite: Economics 201.

Government

201. AMERICAN GOVERNMENT NATIONAL (I;3)
The Federal government. Its powers and organization; powers and functions of the legislative, executive and judicial branches. Our Federal system as it has developed.

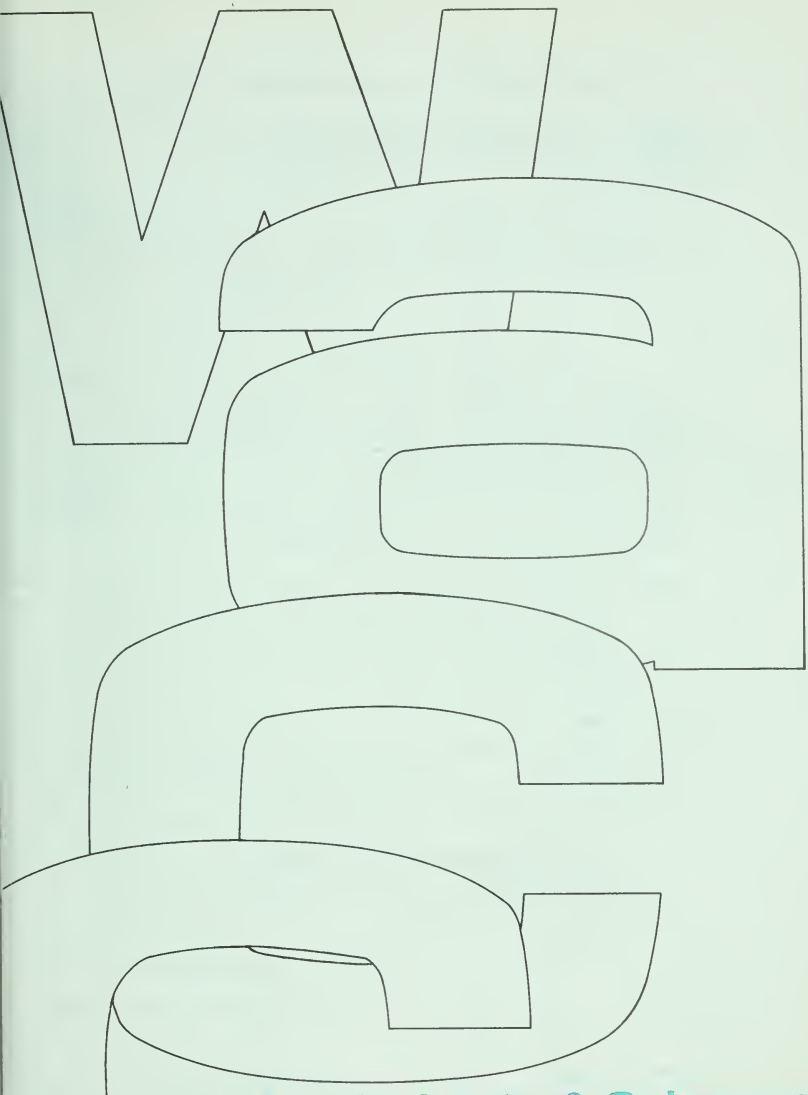
202. STATE AND LOCAL GOVERNMENT (INCLUDING PENNSYLVANIA) (II;3)
Intergovernmental relations. Federal, State and Local government institutions; their functions and responsibilities.

Psychology

101.-102. GENERAL PSYCHOLOGY (I;3:II;3)
An introduction to the study of a science of human behavior.

Sociology

101. INTRODUCTORY SOCIOLOGY (I;3)
An introduction to the methods used by sociologists to study how people live together. Dynamic relationships among society, culture and personality serve as focus for the course materials.



Applied Arts & Sciences

THE WILLIAMSPORT AREA COMMUNITY COLLEGE

SCHOOL OF APPLIED ARTS AND SCIENCES

THE ASSOCIATE DEGREE DIVISION

These are two-year courses designed for entrance into employment at the end of two years. The program will carry at least 24 general education credits in English, mathematics, science, humanities, and social studies. These credits are not specifically designed to be transferable to a four-year college program although some credits may be eligible for such transfer. Graduates from this program will receive an Associate Degree.

Note: It is not anticipated that the physical education courses listed in the Applied Arts and Sciences curriculum will be scheduled before June 1968 due to lack of facilities.

THE SCHOOL OF APPLIED ARTS AND SCIENCES

All courses in the Applied Arts and Sciences School of The Williamsport Area Community College are preceded by two letters which are used for identification.

IDENTIFICATION LETTERS

The Associate Degree Courses		*The Certificate Courses*	
Academic Department			
TM	Technical Mathematics	GM	General Mathematics
TS	Science		
TE	English		
EC	Economics		
Automotive Department			
AU	Automobile Technology	AB	Auto Body Repairing
DT	Diesel Technology	AM	Auto Mechanics
		DM	Diesel Mechanics
		SO	Heavy Equipment Operation and Servicing

The Associate Degree Courses		*The Certificate Courses*	
Aviation Department			
		AA	Aircraft Mechanics—Airframe
		AP	Aircraft Mechanics—Powerplant
Business Administration Department			
BA	Business Administration Accounting Sequence		
BM	Business Administration Business Management Sequence		
BS	Business Administration Secretarial Sequence		
Carpentry Department			
TW	Woodworking Technology	CA	Carpentry
CB	Carpentry and Building Construction Technology	TL	Tile Setting
		MO	Woodworking Machine Operating
		BC	Bench Carpentry
Computer Science Department			
CS	Engineering Computer Science Technology		
CS	Business Computer Science Technology		
Drafting Department			
MD	Engineering Drafting Technology	DC	Mechanical Drafting
TI	Technical Illustration	PI	Production Illustration
TD	Tool Design Technology		
AT	Architectural Technology		
CT	Civil Technology		
ED	Electronic Drafting Technology		
Electrical Department			
EL	Electric Construction Technology	EM	Electric Motor Winding and Repairing
EI	Electric Instrumentation Technology	EW	Electric Construction
Electronics Department			
ET	Electronic Technology		
Health Occupations Department			
		PN	Practical Nursing
		ST	Surgical Technician
Machine Shop Department			
TT	Toolmaking Technology	MG	Machinist-General
Office Machine Repair Department			
OM	Office Machine Technology	OR	Office Machine Repairman

The Associate Degree Courses		*The Certificate Courses*	
Patternmaking Department			
		WP	Patternmaking-Wood
Plumbing Department			
PT	Plumbing and Heating Technology	PL	Plumbing
Printing Department			
GA	Graphic Arts Technology	OP	Offset Printing
Sheet Metal Department			
		SM	Sheet Metal
Sign Painting Department			
		SP	Sign Painting
Welding Department			
WT	Welding Technology	WE	Welding

ARCHITECTURAL TECHNOLOGY (AT)

The Architectural Technology program prepares for the position of draftsman in an architectural and architectural-engineering office. It provides training in accepted drafting practices, making residential and commercial working drawings, first and second year design fundamentals, structural calculations, and site planning. The course units listed below indicate the extent to which the student is made ready to deal with the responsibilities he will face in such a position.

COURSES REQUIRED FOR THE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
AT 10	Basic Arch. Draft.	1	16
AT 10L	Basic Arch. Draft. Lab.	3	144
AT 11	Structures I	3	48
PE 1	Physical Education	1	48
	TOTAL	16	384

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TS 21	Physics-Mechanics	4	64
TE 21	English	3	48
AT 20	Arch. Detailing	2	96
AT 21	Arch. Graphics	2	32
AT 22	Arch. Graphics Lab.	3	144
AT 23	Arch. History	2	32
	TOTAL	16	416

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
AT 31	Residential Design Fundamentals	2	32
AT 32	Residential Design Lab.	3	144
AT 33	Structures II	4	64
AT 34	Bldg. Materials & Meth.	3	48
EC 11	Social Studies	3	48
PE 2	Physical Education	1	48
	TOTAL	16	384

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
AT 40	Fundamentals of Design-Comm., Ind., Religious	2	32
AT 41	Commercial, Industrial, Religious Design Lab.	4	192
AT 42	Mechanical & Elec. Equipment of Bldgs.	3	48
AT 43	Specifications	3	48
TS 32	Physics-Heat & Light	3	48
AT 44	Site Planning	2	32
AT 50	Advanced Arch. Design	2 to	8
AT 60	Advanced Arch. Design	2 to	8
	TOTAL	17	400

AUTOMOBILE TECHNOLOGY (AU)

This course is intended to give a thorough preparation for entering the automotive service field. It includes a study of all types of current internal combustion engines, and other vehicle equipment.

The student is given a thorough preparation in every aspect of automotive maintenance and repair, including the more specialized fields such as wheel alignment and balance, carburetion, ignition, tune-up procedures, brakes and front suspension.

Both theoretical and practical training are given on all phases of automotive service and in the use of modern service tools and equipment.

In addition to the shop theory and practical work, this course offers sufficient hours in mathematics, science, English, and economics to enable the graduate to work along with the engineering staff on design, testing, experimental, and other phases of manufacturing. These academic subjects also would give an excellent base from which to carry on in the pursuit of further engineering type subject matter as might be desired by an employer.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
AU 11	Hand, Machine Tools & Bench Work	2	96
AU 12	Engine Service	3	144
AU 13	Power Train	2	96
AU 18	Electrical Systems	2	96
EC 11	Social Studies	3	48
TM 13	Algebra-Trig.	5	80
	TOTAL	17	560

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
AU 22	Engine Service	3	144
AU 23	Power Train	1	48
AU 25	Differentials	1	48
AU 26	Brakes	2	96
AU 27	Body & Chassis	1	48
AU 29	Fuel Systems	1	48
TE 11	English	3	48
MD 01	Drafting	1	48
PE 1	Physical Education	1	48
	TOTAL	14	576

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
AU 32	Engine Service	1	48
AU 34	Front Suspension	1	48
AU 37	Body & Chassis	1	48
AU 39	Fuel Systems	1	48
WE 03	Int. to Acet. Welding	2	96
WE 04	Int. to Elect. Welding	2	96
TS 21	Physics-Mechanics	4	64
TE 12	English	3	48
MD 01	Drafting	1	48
PE 2	Physical Education	1	48
	TOTAL	17	592

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
AU 40	Engine Tune-up	2	96
AU 41	Trouble Shooting	2	96
AU 44	Front Suspension	2	96
AU 48	Electrical Systems	3	144
TS 31	Physics-Elect. & Magnetism	4	64
TS 32	Physics-Heat & Light	3	48
	TOTAL	16	544

BUSINESS ADMINISTRATION

The Business Administration courses lead to an Associate Degree in Applied Arts. A certificate may be issued to those students who qualify and who would not meet the requirements for the Associate Degree. It may be possible for qualified students to fulfill part of the requirements for an Associate Degree through courses taken in the College Liberal Arts Program.

The Business Administration Department is divided into three sequences; namely, Accounting, Business Management, and Secretarial. Students selecting the Secretarial Sequence, but who do not wish to major in shorthand, may select a Business Machines or Clerk-Typist major. Electives may be taken in business or in other departments where the elective will meet the students' special abilities and vocational needs.

ACCOUNTING SEQUENCE (BA)

The Accounting sequence is designed to give the student a broad business background with specialization in Bookkeeping and Accounting. The graduate is prepared to qualify for the many opportunities in this field.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TE 11	English	3	48
BA 12	Accounting	3	48
	Math-Elective	3	48
BS 10	Typewriting	2	80
BM 13	Principles of Business	3	48
	Elective	2	48
PE 1	Physical Education	1	48
	TOTAL	17	368

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BM 21	Business English	3	48
BA 22	Accounting	3	48
BM 23	Business Mathematics	3	48
	Social Studies	3	48
BM 14	Office Machines	2	80
PE 2	Physical Education	1	48
	TOTAL	15	320

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BA 32	Accounting	3	48
BM 31	Business Law	3	48
	Elective	3	48
BM 33	Business Organization and Management	3	48
BS 34	Office Practice	2	48
CS 11	Introduction to Data Processing	3	48
	TOTAL	17	288

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BA 42	Cost Accounting	3	48
BM 41	Business Law	3	48
BA 43	Payroll & Tax Accounting	3	48
	Elective	3	48
BM 46	Social Studies	3	48
	TOTAL	15	240

BUSINESS MANAGEMENT SEQUENCE (BM)

The Business Management sequence prepares the student for employment as a junior executive or management trainee in the fields of marketing, insurance, banking or general business.

Business concepts and their implications to our economy are covered in addition to the specific employment objectives.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TE 11	English	3	48
BA 12	Accounting	3	48
BM 14	Office Machines	2	80
BM 13	Principles of Business	3	48
	Math-Elective	3	48
	Elective	2	48
PE 1	Physical Education	1	48
	TOTAL	17	368

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BM 21	Business English	3	48
BA 22	Accounting	3	48
BS 10	Typewriting	2	80
	Social Studies	3	48
BM 23	Business Mathematics	3	48
	Elective	2	48
PE 2	Physcial Education	1	48
	TOTAL	17	368

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BM 31	Business Law	3	48
BM 14	Office Practice	2	48
BM 33	Business Org. and Mgmt.	3	48
BM 35	Psychology	3	48
CS 01	Introduction to Data Processing	3	48
BM 36	Marketing	3	48
	TOTAL	17	288

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BS 20	Typewriting	2	80
BM 41	Business Law	3	48
	Elective	3	48
BM 46	Social Studies	3	48
BM 45	Finance	3	48
BA 43	Payroll & Tax Accounting	3	48
	TOTAL	17	320

SECRETARIAL SEQUENCE (BS)

This is a two year program designed to give students a substantial training in shorthand, typewriting, basic general education for business and to perfect secretarial skills leading to positions of responsibility in business. The Gregg Jubilee system of shorthand is taught.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TE 11	English	3	48
BS 10	Typewriting	2	80
BS 11	Business Behavior	2	32
BS 14	Shorthand	3	80
	Elective	3	48
BA 12	Accounting	3	48
PE 1	Physical Education	1	48
	TOTAL	17	384

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BM 21	Business English	3	48
BM 23	Business Mathematics	3	48
BS 23	Office Practice	2	48
BM 14	Office Machines	2	80
BS 24	Shorthand	3	80
BS 20	Typewriting	2	80
PE 2	Physical Education	1	48
	TOTAL	16	432

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BS 34	Shorthand Workshop	6	96
BM 13	Principles of Business	3	48
	Elective	3	48
BS 30	Typewriting	2	80
	Social Studies (Elec.)	3	48
	TOTAL	17	320

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BS 44	Secretarial Workshop	9	144
BM 35	Psychology	3	48
BM 46	Social Studies	3	48
	Elective	2	48
	TOTAL	17	288

BUSINESS COMPUTER SCIENCE TECHNOLOGY (CS)

The specific objective of this course is to train men and women as computer programmers for the scientific and business fields. The course is designed to provide a broad and thorough knowledge in programming techniques with actual experience on the computer systems and peripheral data processing equipment.

The students of this department may elect to place their major emphasis in either engineering or business areas as dictated by their desires and employment interest.

With experience and continued study, graduates of this course may rise to executive positions in the data processing field.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
BA 12	Accounting I	3	48
CS 10	Basic Computing Mach.	3	96
CS 11	Computer Prog.	4	128
	TOTAL	18	400

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 23	Finite Math	3	48
TE 21	English	3	48
BA 22	Accounting II	3	48
TM 24	Engineering Statistics	3	48
CS 12	Algebraic Comp. Programming	3	96
PE 1	Physical Education	1	48
	TOTAL	16	336

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BM 23	Business Math	3	48
BM 33	Business Organization	3	48
TS 21	Physics-Mechanics	4	64
CS 20	Advanced Prog.	3	96
CS 23	Systems Devel. I	3	80
PE 2	Physical Education	1	48
	TOTAL	17	384

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
	Science or Business Elective	3	48
	Social Studies Elective	3	48
CS 24	System Devel. II	3	112
CS 22	Prog. Systems and Schedulers	3	80
	Computer Science Elective	3	96
	TOTAL	15	384

CARPENTRY AND BUILDING CONSTRUCTION TECHNOLOGY (CB)

To the student who qualifies, this course provides instruction in the basic skills and techniques employed in light building construction. Emphasis is placed on the more advanced theories and technical information, required in such areas as design, construction, cost estimating, and management.

The program includes a study of the basic principles of carpentry and masonry construction, building materials and equipment, surveying, estimating, principles of architecture, and mechanical drafting, as well as technical mathematics, science, physics and English.

Successful completion of this course will prepare the student to enter the industry as an advanced apprentice leading to positions of foreman, building technician, or superintendent.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	Title	Cr.	Hrs.
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
CB 10	Hand Tools	3	144
CB 12	Portable Tools-Wood Shop Machines	3	144
PE 1	Physical Education	1	48
CB 16	Safety Education	1	16
	TOTAL	16	480

SECOND SEMESTER

No.	Title	Cr.	Hrs.
TE 21	English	3	48
TS 21	Physics-Mechanics	4	64
MD 01	Mechanical Drawing	3	144
CB 23	Block Construction	4	192
PE 2	Physical Education	1	48
	TOTAL	15	496

THIRD SEMESTER

No.	Title	Cr.	Hrs.
TS 32	Physics-Heat & Light	3	48
TM 21	Analytical Trig.	4	64
AT 10	Basic Arch. Drafting	3	144
CB 32	House Framing	2	96
CB 33	Masonry, Brick Const.	5	240
	TOTAL	17	592

FOURTH SEMESTER

No.	Title	Cr.	Hrs.
CB 41	House Construction	5	240
CB 43	Int. Fin. & Cab. Work	2	96
CB 44	Building Maintenance	2	96
EC 11	Social Studies	3	48
EL 12	Basic Wiring	2	96
	TOTAL	14	576

CIVIL TECHNOLOGY (CT)

The purpose of the Civil Technology Program is to provide a broad and thorough knowledge of Civil Technology as it relates to the field of Civil Engineering.

The curriculum is designed to present an all-encompassing program which meets the requirements of the Civil Engineering Profession. Highway Engineering, Surveying (including geodesy), Cartography and Photogrammetry are subjects which constitute the major field of study; mathematics, physics, economics and English are supporting subjects.

To graduate with an Associate Degree in Civil Technology, the student is required to complete the following curriculum of 68 credit hours.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
MD 10	Basic Drafting	4	128
CT 10	Surveying	5	192
PE 1	Physical Education	1	48
	TOTAL	18	496

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs*
TE 21	English	3	48
TS 21	Physics-Mechanics	4	64
CT 20	Surveying	5	192
CT 21	Cartography	5	144
PE 2	Physical Education	1	48
	TOTAL	18	496

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 21	Analytical Trig.	4	64
CT 31	Engineering Tech.	3	80
CT 30	Surveying	5	192
CT 32	Photogrammetry	3	80
EC 11	Social Studies	3	48
	TOTAL	18	464

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 31	Calculus I	4	64
AT 11	Structures	2	32
CT 41	Engineering Tech.	3	80
CT 40	Surveying	5	192
CT 42	Photogrammetry	3	80
	TOTAL	17	448

DIESEL TECHNOLOGY (DT)

This course gives a thorough preparation for entering the diesel service field, such as heavy truck mechanics, construction equipment mechanics, and other areas on land and water where diesel engines are used.

The course prepares the student in learning service of diesel engines, and diesel powered equipment of many types.

This course offers sufficient academic hours in mathematics, science, English, and economics to enable a graduate to work with a manufacturers engineering staff in the experimental lab, or in design work and testing.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	Title	Cr.	Hrs.
T 11	Hand, Machine Tools & Bench Work	2	96
T 12	Engine Principles	2	96
T 15	Power Train	1	48
T 16	Engine Maintenance	2	96
T 18	Electrical Systems	2	96
C 11	Social Studies	3	48
M 13	Algebra-Trig.	5	80
	TOTAL	17	560

SECOND SEMESTER

No.	Title	Cr.	Hrs.
DT 22	Engine Principles	1	48
DT 23	Combustion, Fuels & Injection Systems	2	96
DT 25	Power Train	1	48
DT 26	Engine Maintenance	3	144
DT 28	Electrical Systems	2	96
TE 11	English	3	48
MD 01	Drafting	1	48
PE 1	Physical Education	1	48
	TOTAL	14	576

THIRD SEMESTER

No.	Title	Cr.	Hrs.
T 33	Combustion, Fuels & Injection Systems	3	144
E 03	Int. to Acet. Welding	2	96
E 04	Int. to Elect. Welding	2	96
S 21	Physics-Mechanics	4	64
D 01	Drafting	1	48
E 21	English	3	48
E 2	Physical Education	1	48
	TOTAL	16	544

FOURTH SEMESTER

No.	Title	Cr.	Hrs.
DT 46	Engine Maintenance	2	96
DT 47	Pumps & Accessories	6	288
DT 49	Testing & Power Measurement	1	48
TS 31	Physics-Elect. & Magnetism	4	64
TS 32	Physics-Heat & Light	3	48
	TOTAL	16	544

ELECTRICAL CONSTRUCTION TECHNOLOGY (EL)

This course is designed to give the student who has the ability to learn and the desire to advance in his field, a thorough background of electrical knowledge in fundamental theory, circuits, industrial electronics, electrical machinery, and the mechanics of electrical construction. In addition, the student is given courses in math, physics, and English, in order to better prepare him for whatever phase of electrical work he may enter.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EL 11	Direct Current Fund.	3	48
EL 12	Basic Wiring Lab.	2	96
EL 13	Direct Current Lab.	2	96
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
PE 1	Physical Education	1	48
	TOTAL	16	416

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EL 21	Alternating Current Fund.	3	48
EL 22	Alternating Current Lab.	2	96
ED 10	Basic Drafting Electronics (option)	2	96
TM 22	Analytical Trig.	4	64
TE 21	English	3	48
TS 21	Physics-Mechanics	4	64
PE 2	Physical Education	1	48
	TOTAL	19	464

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EL 31	Basic Electrical Const. Lab.	2	96
EI 32	Industrial Electronics	3	48
EI 33	Basic Electronic Lab.	2	96
EL 34	Motor Control & Servomechanism Lab.	2	96
EL 35	Residential Wiring and Code	2	32
EL 36	Electrical Repair and Maintenance	2	96
EC 11	Social Studies	3	48
	TOTAL	16	512

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EL 41	Commercial and Industrial Wiring	3	48
ED 20	Electronic Drafting	3	144
EL 43	Advanced Maintenance and Repair Lab.	3	144
EL 44	Advanced Electrical Const. Lab.	3	144
TS 32	Physics-Heat & Light	3	48
	TOTAL	15	528

ELECTRICAL INSTRUMENTATION TECHNOLOGY (EI)

This course is designed to provide the student with a thorough understanding of basic DC and AC electricity, magnetism, electron tubes, solid state devices, motor controls, and servomechanisms. The course includes the study of measuring principles involving the use of instruments that will measure temperature, pressure, humidity, displacement, level, flow and viscosity.

The student is taught to lay out, assemble, and wire basic electrical, electronic, and electromechanical circuits in the laboratory.

Advanced subjects include theory and practice of electronic test instruments, control systems, computer principles, instrument calibration, and standardization.

Mastery of this curriculum is preparatory to employment as a highly skilled technician in the field of instrumentation. Graduates can be employed as engineering aids, service specialists, laboratory technicians, and research technicians.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EL 11	Direct Current Fund.	3	48
EL 12	Basic Wiring Lab.	2	96
EL 13	Direct Current Lab.	2	96
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
PE 1	Physical Education	1	48
	TOTAL	16	336

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EL 21	Alternating Current Fund.	3	48
EL 22	Alternating Current Lab.	2	96
ED 10	Basic Drafting Electronics (option)	2	96
TM 21	Analytical Trig.	4	64
TE 21	English	3	48
TS 21	Physics-Mechanics	4	64
PE 2	Physical Education	1	48
	TOTAL	19	464

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EI 32	Industrial Electronics	3	48
EI 33	Basic Electronic Lab.	2	96
EI 31	Basic Instrumentation	2	32
EI 35	Basic Instrumentation Lab.	1	48
EL 34	Motor Control and Servomechanism Lab.	2	96
EC 11	Social Studies	3	48
TM 31	Technical Calculus	3	48
ED 20	Electronic Drafting	1	48
	TOTAL	17	464

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TS 32	Physics-Heat & Light	3	48
EI 41	Elect. Instrumentation	3	48
EI 42	Elect. Inst. Lab.	3	144
CS 12	Introduction to Computer Programming	2	64
TS 22	Chemistry and Metallurgy	4	64
EI 45	Calib. & Std.	1	48
	TOTAL	16	416

ELECTRONICS DRAFTING TECHNOLOGY (ED)

The objective of this course is to provide broad and thorough academic knowledge and skills in Mechanical Drafting practices and to apply them in the field of electronics.

The Electronics Draftsman may be responsible for making required electronic and mechanical drawings, working closely with electronic engineers, electronic technicians and electronic lab equipment in experimental design and testing, and in product design for production. His work may be correlated in other individuals and in related activities.

The fields of application as an "electro-mechanical" draftsman includes: Instrumentation and Radar, Sonar, Infrared, Electronic Control Systems, and other Electronic and Communication systems and equipment. Required: A high school background or equivalent; a background in math, science, and English is desirable. Technical courses are important but a good, progressive academic education is also essential.

With experience and study, a graduate can rise through positions as draftsman, designer, layout draftsman, etc., to responsible positions in the engineering field or related fields.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 13	Algebra-Trig.	5	80
ET 11	Basic Electricity	5	80
ET 12	Basic Electricity Lab.	3	144
ED 11	Electronic Drafting	3	144
PE 1	Physical Education	1	48
	TOTAL	17	496

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 21	Analytical Trig.	4	64
ET 21	Basic Electronics	5	80
ET 22	Basic Electronics Lab.	3	144
ET 23	Circuit Analysis	3	48
ED 20	Basic Drafting	3	144
PE 2	Physical Education	1	48
	TOTAL	19	528

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TS 21	Physics-Mechanics	4	64
ET 31	Advanced Electronics	5	80
ET 32	Advanced Elect. Lab.	3	144
ED 30	Electronics Drafting	3	144
TE 11	English	3	48
	TOTAL	18	480

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TS 32	Physics-Heat & Light	3	48
ET 43	Transistors	3	48
EC 11	Social Studies	3	48
ED 40	Electronics Drafting-Adv.	4	192
TE 21	English	3	48
CS 02	Intro. to Comp. Prog.	2	48
	TOTAL	18	432

ELECTRONICS TECHNOLOGY (ET)

Graduates of this course will enter industry as electronic technicians, where they will assist electrical engineers in the design, construction and testing of all kinds of electronic equipment. The number of electronic technicians graduated each year in the United States constantly falls below the needs of industry. Approximately three technicians are needed for each engineer.

The first year of the course is spent mastering the basic principles of electron theory and practice. Advanced electron theory, including frequency modulation, microwaves, transistors and television are covered during the second year. During this period the laboratory work consists of the construction and testing of amplifiers, receivers and other sophisticated electronic equipment.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
ET 11	Basic Electricity	5	80
ET 12	Basic Electronics Lab.	3	144
PE 1	Physical Education	1	48
	TOTAL	17	400

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 21	Anal. Trig.	3	48
TE 21	English	3	48
ET 21	Basic Electronics	5	80
ET 22	Basic Electronics Lab.	3	144
ET 23	Circuit Analysis	3	48
PE 2	Physical Education	1	48
	TOTAL	18	416

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TS 21	Physics-Mechanics	4	64
TM 31	Calculus I	4	64
ED 10	Drafting	2	96
ET 31	Advanced Electronics	5	80
ET 32	Adv. Electronics Lab.	3	144
	TOTAL	18	448

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TS 32	Physics-Heat & Light	3	48
ET 41	Television	5	80
ET 42	Television Lab.	3	144
ET 43	Transistors	3	48
EC 11	Social Studies	3	48
	TOTAL	17	368

ENGINEERING COMPUTER SCIENCE TECHNOLOGY (CS)

The specific objective of this course is to train men and women as computer programmers for the scientific and business fields. The course is designed to provide a broad and thorough knowledge in programming techniques with actual experience on the computer systems and peripheral data processing equipment.

The students of this department may elect to place their major emphasis in either engineering or business areas as dictated by their desires and employment interest.

With experience and continued study, graduates of this course may rise to executive positions in the data processing field.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
BA 12	Accounting I	3	48
CS 10	Basic Computing Mach.	3	96
CS 11	Computer Prog.	4	128
	TOTAL	18	400

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 23	Finite Math	3	48
TE 21	English	3	48
TM 24	Engineering Statistics	3	48
	Social Studies Elect.	3	80
MD 01	Drafting	2	96
CS 12	Algebraic Computer Programming	3	96
	TOTAL	17	416

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 31	Calculus I	4	64
TS 21	Physics-Mechanics	4	64
EI 32	Industrial Electronics	2	32
CS 20	Advanced Prog.	3	96
CS 26	Engineering Prog.	3	96
PE 1	Physical Education	1	48
	TOTAL	17	400

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 41	Calculus II	3	48
TS 32	Physics-Heat & Light	3	48
CS 27	Numerical Methods and Programming	3	96
CS 23	Systems Devel. I	3	80
	Computive Science Elect.	3	80
PE 2	Physical Education	1	48
	TOTAL	16	400

ENGINEERING DRAFTING TECHNOLOGY (MD)

The objective of this course is to provide a broad knowledge of mechanical drafting and engineering procedures and to provide the student with the necessary background in mathematics, science, and communication skills to work as a technician or engineering aid.

The graduate of this program may be responsible for making a variety of engineering drawings from detail drawings to layouts, as he progresses, to certain engineering calculations within the province of his assignments.

He may initially qualify as a draftsman for a variety of industrial and manufacturing establishments; and with advancement, experience and training, to such positions as checker, layout draftsman, designer and chief draftsman, or positions in related areas depending upon a background in engineering drafting.

A good academic high school background is important.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
MD 10	Basic Drafting I	4	128
MD 11	Basic Drafting II	4	128
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
	TOTAL	16	384

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
MD 20	Applied Drafting Techniques I	4	128
MD 21	Applied Drafting Techniques II	4	128
TM 21	Analytical Trig.	4	64
TE 21	English	3	48
PE 1	Physical Education	1	48
	TOTAL	16	416

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
MD 30	Mechanisms I	4	128
MD 31	Mechanisms II	4	128
TM 31	Calculus I	4	64
TS 21	Physics-Mechanics	4	64
MG 01	Machine Shop	1	16
WP 01	Wood Pattern	1	16
	TOTAL	18	416

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
MD 40	Advanced Detail	4	128
MD 41	Adv. Detail & Design	4	128
TS 32	Physics-Heat & Light	3	48
EC 11	Social Studies	3	48
PE 2	Physical Education	1	48
	TOTAL	15	400

GRAPHIC ARTS TECHNOLOGY (GA)

The college offers the Associate in Applied Science Degree in Graphic Arts Technology. This course is designed for those who wish to enter this field and have no experience; or are now employed in the Graphic Arts and wish to become more proficient.

Successful completion of the Degree Program leads to eventual placement in production positions in advertising agencies and studios, art services, commercial photographic studios, engraving plants, printing and publishing houses, in-plant printing departments, department stores, magazine and periodical offices, organizations and associations.

The training encompasses every aspect of the field from copy preparation to the finished printed piece. The how's and why's are applied to such phases of production as copyfitting, typography, photomechanics, analysis and proper selection of paper, ink, and methods of reproduction.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
MD 01	Mechanical Drawing	2	64
TM 11	Algebra	3	48
BS 10	Typing	1	48
GA 10	Reproduction Processes	1	16
GA 11	Photo Process I	3	112
GA 12	Offset Stripping I	2	64
GA 13	Platemaking	2	64
PE 1	Physical Education	1	48
	TOTAL	15	464

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TE 11	English	3	48
TM 12	Numerical Trigonometry	3	48
GA 20	Copy Preparation I	2	64
GA 21	Photo Process II	2	96
GA 22	Cold Composition I	1	48
GA 24	Press Operation I	3	112
GA 25	Materials of Printing Production	1	16
	TOTAL	15	432

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EC 11	Social Studies	3	48
TS 21	Physics-Mechanics	4	64
GA 30	Copy Preparation II	2	64
GA 31	Publication Photography	2	64
GA 32	Cold Composition II	1	48
GA 33	Photo Composition	1	48
GA 34	Screen Process	1	48
PE 2	Physical Education	1	48
	TOTAL	15	432

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
GA 40	Bindery Methods & Procedures	2	64
GA 41	Photo Process III	3	112
GA 42	Offset Stripping II	3	112
GA 43	Direct Image	2	64
GA 44	Press Operation II	3	112
GA 45	Creative Graphic Arts Project	2	64
	TOTAL	15	528

OFFICE MACHINE TECHNOLOGY (OM)

Outstanding opportunities are available to men trained as technicians in the office machines industry. Emphasis on labor-saving devices has increased the need for men skilled in the servicing and repairing of this equipment.

Training includes detailed operation, functions of component parts and sections, diagnosing of machine troubles, and the testing of machines.

Math, physics, English, basic electronics and introduction to data processing are also presented to develop the individual to meet the requirements of today's office machine technician.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
BS 10	Typing	1	48
OM 11	Intro. to Typewriters	1	48
OM 12	Machine Test	1	48
OM 13	Theory	2	32
OM 14	Service Work	1	48
OM 15	Machine Sections	2	96
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
	TOTAL	16	448

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
OM 21	Dis. & Reassembly	3	144
OM 22	Work Jobs	2	96
OM 23	Elec. Typewriters	2	96
TS 21	Physics-Mechanics	4	64
TE 22	English	3	48
PE 1	Physical Education	1	48
	TOTAL	15	496

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
OM 31	Intro. to Adders	1	48
OM 32	Appl. of Adders	1	48
OM 33	Serv. of Adders	1	48
OM 34	Adj. & Repair	2	96
OM 35	Cr. Bal. Add. Mach.	1	48
TS 31	Physics-Elect. & Mag.	4	64
ET 11	Basic Elec.	5	80
PE 2	Physical Education	1	48
	TOTAL	16	480

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
OM 41	Intro. to Dup.	1	48
OM 42	Oper. Dup.	1	48
OM 43	Serv. & Rep.	2	96
OM 44	Intro. to Calculator	1	48
OM 45	Motor Circuits	1	48
OM 46	Off. Mach. Bus. Mgmt.	4	64
CS 01	Intro. to Data Pro.	3	80
EC 11	Social Studies	3	48
	TOTAL	16	480

PLUMBING AND HEATING TECHNOLOGY (PT)

The objective of the plumbing and heating course is to qualify students for practical work, as well as for estimating, design, construction, and consultant. To qualify for any of these positions, the plumbing and heating technician must be well trained in plumbing skills, mathematics, science, English, and economics. After having successfully completed this course, the student should be ready to qualify for a position in any phase of plumbing.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 11	Algebra	3	48
TE 11	English	3	48
PT 11	Use of Tools, Plumbing Math., Septic Tanks	4	192
PT 12	Theory	1	16
PT 13	Building Maintenance	2	96
PT 15	Steam/Hot Water Heating	2	96
PT 16	Steam Heating Theory	1	16
	TOTAL	16	512

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 12	Numerical Trig.	3	48
PT 20	Venting/Drainage Thry.	1	16
PT 21	Venting & Drainage	2	96
PT 22	B/P Reading/Estimating	3	48
PT 23	Building Maintenance	2	96
PT 24	Lead Working-Basic	2	96
PT 26	Lead Working Theory	1	16
PT 25	Hot Water Heating-Basic	2	96
	TOTAL	16	512

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TS 21	Physics-Mechanics	4	64
TE 21	English	3	48
PT 30	Water Distribution	1	16
PT 31	Water Distribution	3	144
PT 33	Building Maint. Adv.	2	96
PT 35	Steam/Hot Water Heating Advanced	3	144
PE 1	Physical Education	1	48
	TOTAL	17	560

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TS 32	Physics-Heat & Light	3	48
EC 11	Social Studies	3	48
PT 40	Venting/Drainage Theory	1	16
PT 41	Venting and Drainage	2	96
PT 44	Lead Wiping	2	96
PE 2	Phy. Ed.	1	48
WE 11	Acety. Welding	2	96
WE 20	Elect. Welding	2	96
	TOTAL	16	544

TECHNICAL ILLUSTRATION (TI)

The purpose of this course is to develop the skills, basic knowledge, proper attitude, and appreciation for successful entrance and advancement in the field of technical illustration.

This involves the interpretation of engineering drawings into illustrations for the general purpose of clarifying difficult subjects, whether technical or otherwise by pictorial representation.

Illustrations are used for proposal drawings and technical publications such as: instruction and service manuals, text books, parts catalogs, and sales literature.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TI 10	Drafting	4	128
TI 11	Rendering I	4	128
TM 11	Algebra	3	48
TE 11	English	3	48
PE 1	Physical Education	1	48
	TOTAL	15	400

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TI 20	Color	4	128
TI 21	Perspective Drawing	4	128
TM 12	Numerical Trig.	3	48
TE 21	English	3	48
PE 2	Physical Education	1	48
	TOTAL	15	400

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TI 30	Rendering II	4	128
TI 31	Axonometric Drawing	4	128
TI 32	Layout & Design	2	64
TS 21	Physics-Mechanics	4	64
MG 01	Machine Shop	1	16
	TOTAL	15	400

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TI 40	Illustration Pract.	4	128
TI 41	Technical Drawing	4	128
GA 10	Rep. Pro.	1	16
GA 20	Copy Prep. I	2	64
WP 01	Wood Patternmaking & Foundry Practice	1	16
EC 11	Social Studies	3	48
	TOTAL	15	400

TOOL DESIGN TECHNOLOGY (TD)

Tool designers help plan and make drawings of special mechanical devices that are needed in production. Generally these devices might be classified as cutting tools, gages, dies, jigs or fixtures. They vary in nature from simple hand tools to complex progressive dies.

To make these drawings, the tool designer must have ability in drafting and mathematics, along with a thorough knowledge of tool room and production practices. Under many conditions he will be given an idea or a suggestion and his job will be to develop this into a drawing of an efficient, economical tool. Writing the program for production jobs on tape-controlled machines is a tool design activity.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TD 10	Basic Drafting	4	192
TD 11	Tool Drafting	4	192
TM 13	Algebra-Trig.	5	80
PE 1	Physical Education	1	48
	TOTAL	14	512

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TD 20	Cutting Tool Design	4	192
TD 21	Fixture Design	4	192
TM 21	Analy. Trig.	4	64
TE 11	English	3	48
TT 01	Basic Machine Shop	2	96
	TOTAL	17	592

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TD 30	Mechanisms I	4	192
TD 31	Mechanisms II	4	192
TS 21	Physics-Mechanics	4	64
TT 02	Basic Machine Shop	2	96
TE 21	English	3	48
PE 2	Physical Education	1	48
	TOTAL	18	640

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TS 22	Chem. of Metals (Elect.)	4	64
TD 40	Gage Design and Prog.	4	192
TD 41	Die Design	4	192
EC 11	Social Studies	3	48
TS 32	Physics-Heat & Light	3	48
TT 03	Basic Machine Shop	2	96
	TOTAL	20	640

TOOLMAKING TECHNOLOGY (TT)

The toolmaking technology course is designed primarily for the student who wishes to become a liaison employee between the engineer and the shop superintendent or foreman.

In this course the student must be qualified to handle all of the mathematics involved, and to write necessary technical reports, including the routing of jobs, sequence of operations, etc. This course includes enough basic machine work to acquaint the student with the various machines and their operation.

Approximately one third of the course is composed of academic subjects including mathematics, English, science, economics, and physical education, the remainder being in lab or shop, including machine operation, blueprint reading, mechanical drawing and theory.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 13	Algebra-Trig.	5	80
TE 11	English	3	48
PE 1	Physical Education	1	48
TT 10	Bench Work	1	48
TT 11	Drill Press	1	48
TT 12	Engine Lathe	3	144
TT 13	Milling Machines	3	144
TT 14	Shaper	1	48
	TOTAL	18	608

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TE 21	English	3	48
PE 2	Physical Education	1	48
MD 01	Mechanical Drafting	2	96
TT 20	Turret Lathe & Automatic Screw Machines	4	192
TT 21	Quality Control Blueprint Reading	4	192
	TOTAL	14	576

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EC 11	Social Studies	3	48
TS 21	Physics-Mechanics	4	64
TT 30	Bench Work	1	48
TT 31	Jig Borer	1	48
TT 32	Engine Lathe	3	144
TT 33	Milling Machines	3	144
TT 35	Shaper	1	48
	TOTAL	16	544

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 21	Analytical Trig.	4	64
TS 22	Chemistry & Metallurgy	4	64
TT 40	Grinding Machines	6	288
TT 41	Heat Treating	3	144
	TOTAL	17	560

WELDING TECHNOLOGY (WT)

The objective of the Associate Degree in welding is to supply industry with high caliber manpower who has received both an intellectual and practical background. The curriculum is designed to fill positions as supervisors, sales engineers, technical writers, and laboratory technicians.

The technician also plays a vital role in fabrication and repair of metal parts. New welding processes are being developed rapidly, requiring the necessary skills, as well as technical knowledge in electric, acetylene, and inert processes.

There is a definite place in many industries for the man who has training in this field.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 13	Algebra-Trig.	5	80
WT 11	Acetylene Welding	7	336
MD 01	Mechanical Draft.	2	96
PE 1	Physical Education	1	48
	TOTAL	15	560

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 21	Analytical Trig.	4	64
TE 11	English	3	48
WT 20	Electric Welding	8	384
WT 23	Blueprint Reading & Layout	1	48
PE 2	Physical Education	1	48
	TOTAL	17	592

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 31	Calculus I	3	48
TS 21	Physics-Mechanics	4	64
WT 33	Advance Acetylene Welding (Alloy)	1	48
WT 34	Advance Electric Welding	3	144
WT 35	Inert Gas Welding (TIG)	3	144
WT 36	Pipe Layout & Fabrication	1	48
WT 37	Physical Testing of Welds	1	48
	TOTAL	16	544

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EC 11	Social Studies	3	48
WT 43	Advance Acetylene Welding (Aircraft)	1	48
WT 44	Advance Electric Welding (Code)	3	144
WT 45	Inert Gas Welding (MIG)	4	192
TS 22	Chemistry & Metallurgy	4	64
WT 47	Physical Testing of Welds	1	48
	TOTAL	16	544

WOODWORKING TECHNOLOGY (TW)

The woodworking technology course may be described as a program wherein the more technical, logical advances of the woodworking industry are studied.

This course consists not only of shop practices acceptable to industry, but they must perform their work with speed and dispatch and with the same accuracy demands as employed by manufacturing films or planning mills.

Training will include classes in math, English, physics, and economics, these academic courses should assist the individual in his preparation for supervisor work.

REQUIRED FOR THE ASSOCIATE DEGREE

FIRST SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 11	Algebra	3	48
TE 11	English	3	48
EC 11	Social Studies	3	48
PE 1	Physical Education	1	48
TW 10	Design of Wood	2	96
TW 11	Layout-Cutting Stock	5	240
	TOTAL	17	528

SECOND SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TE 21	English	3	48
TM 12	Num. Trig.	3	48
MD 01	Mech. Draft.	3	144
PE 2	Physical Education	1	48
TW 20	Machine Cutting	1	48
TW 21	Wood Shop Machines	4	182
	TOTAL	15	518

THIRD SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
TM 21	Analytical Trig.	3	48
TS 21	Physics-Mechanics	4	64
AT 20	Arch. Drafting	3	144
TW 30	Wood Turning	1	48
TW 31	Fastening	2	96
TW 32	Veneer/Bending, etc.	2	96
TW 33	Structures	1	48
	TOTAL	16	544

FOURTH SEMESTER

No.	*Title*	*Cr.*	*Hrs.*
EL 12	Basic Wiring	2	96
TS 32	Physics-Heat & Light	3	48
TW 40	Patternmaking	1	48
TW 41	Finishing	1	48
TW 42	B/P Reading	2	96
TW 43	Prod. Jig & Fixtures	3	144
TW 44	Knife Grinding & Layout	2	96
	TOTAL	14	576

VCE

Certificate

THE WILLIAMSPORT AREA COMMUNITY COLLEGE

SCHOOL OF APPLIED ARTS AND SCIENCES

THE CERTIFICATE DIVISION

All curriculums in the Certificate Division are based on clock hours and emphasis is placed on skills.

The general education courses are limited to applied shop arithmetic and a course in economics. The entrance requirements are somewhat less than the Technology Curriculum.

Graduates from this program will receive a Certificate.

AIRCRAFT MECHANICS—AIRFRAME (AA)
AIRCRAFT MECHANICS—POWERPLANT (AP)

This course provides the training required for positions demanding a technical background in structures, powerplants, operation, maintenance, and repair.

A Federal Aviation Agency approved school is operated as an integral part of the curriculum. All students who complete the Airframe and Powerplant curriculum should have no difficulty in obtaining his A and P Licenses.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
GM 11	Arithmetic/Geometry	48
AP 10	Powerplant Theory	90
AP 11	Basic Dissassy. Overhaul & Assy.	96
AP 12	Basic Carburetion Systems	80
AP 13	Basic Electric Systems	72
AP 14	Basic Inspection & Magnaflux	24
AP 15	Lubrication & Oiling Systems	48
AP 16	Operation & Trouble Shooting	62
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
AP 20	Adv. Dissassy. Overh. & Assy.	100
AP 21	Advanced Inspection & Magnaflux	24
AP 22	Advanced Carburetion Systems	32
AP 23	Powerplant Maintenance	72
AP 24	Powerplant Instruments	16
AP 25	Block Testing	24
AP 26	Adv. Electric Systems	72
AP 27	Propellers	96
AP 28	Federal Air Regulations	16
AP 29	Powerplant Installation	20
MD 01	Mechanical Drawing	48
	Final Examination	
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
MD 01	General Drafting	48
AA 30	Aerodynamics	40
AA 31	Aircraft Systems	48
AA 32	Aircraft Woodworking	70
AA 33	Fabric, Dope, Finishing	170
AA 34	Aircraft Welding	144
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
EC 11	Social Studies	48
AA 40	Aviation Sheet Metal	220
AA 41	Rigging and Assembly	212
AA 42	Electric Systems	30
AA 43	Federal Air Regulations	10
	Final Examination	
	TOTAL	520

AUTOMOBILE BODY REPAIRING (AB)

This course is designed to give the student a thorough knowledge of auto body repairing and refinishing. This will consist of mechanics pertaining to body repair and maintenance, welding, straightening, panel installations, trim and glass work, refinishing and estimating. The student will obtain the knowledge needed in a modern, progressive body shop.

A student who successfully completes the course will be qualified to enter the field as a junior-grade used car reconditioner, body repairman, or refinisher. He will be qualified to set up and maintain his own business after experience is obtained in a body shop.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
AB 11	Hand, Machine Tools, and Bench Work	48
AB 13	Body & Chassis	96
AB 16	Sanding	48
AB 17	Masking	48
AB 18	Metal Working	88
WE 03	Int. to Acet. Welding	96
WE 04	Int. to Elect. Welding	96
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hr*
AB 22	Front Suspension	4
AB 23	Interior Trim	9
AB 24	Panel Installation	4
AB 25	Used Car Reconditioning	9
AB 26	Sanding	9
AB 27	Masking	4
AB 28	Metal Working	9
	TOTAL	52

THIRD SEMESTER

No.	*Title*	*Hrs.*
AB 30	Color Matching	40
AB 31	Filling	96
AB 32	Panel Installation	48
AB 36	Sanding	48
AB 38	Metal Working	96
AB 39	Painting	192
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hr*
AB 40	Color Matching	4
AB 41	Estimating Damage	9
AB 42	Panel Installation	4
AB 44	Electrical Systems	4
AB 46	Special Tools & Equipment	4
AB 48	Metal Working	4
AB 49	Painting	14
EC 11	Social Studies	4
	TOTAL	52

AUTOMOBILE MECHANICS (AM)

This course is intended to give a thorough preparation for entering the automotive service field. It includes a study of all types of current internal combustion engines, and other vehicle equipment.

The student is given a thorough preparation in every aspect of automotive maintenance and repair, including the more specialized fields such as wheel alignment and balance, carburetion, ignition, tune-up procedures, brakes and front suspension.

The ever-increasing vehicle population and the constant improvements in modern cars and trucks require that automotive mechanics have the type of training which can be secured best in a well-equipped school. Both theoretical and practical training are given on all phases of automotive service and in the use of modern service tools and equipment.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
AM 11	Hand, Machine Tools, and Bench Work	96
AM 12	Engine Service	280
AM 18	Electrical Systems	96
EC 11	Social Studies	48
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
AM 22	Engine Service	240
AM 23	Power Train	96
AM 25	Differentials	40
AM 26	Brakes	144
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
AM 34	Front Suspension	136
AM 37	Body & Chassis	96
AM 38	Electrical Systems	96
WE 03	Int. to Acet. Welding	96
WE 04	Int. to Elect. Welding	96
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
AM 48	Electrical Systems	96
AM 49	Fuel Systems	192
AM 40	Engine Tune-up	136
AM 41	Trouble Shooting	96
	TOTAL	520

BENCH CARPENTRY (BC)

Bench Carpentry consists mainly of assembling parts already partially machined or prepared by the regular machine operator. However, his assignment usually consists of constructing the original before it goes on production, doing the unusual, or in some instances where just a few of a kind are required.

His duties may consist of constructing staircases, fine furniture, doors or sash, cupboards, and any special piece for display purposes.

He may work with machines as well as all hand tools and be expected to work accurately to within 1/32 of an inch.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
BC 10	Safety Ed.	20
BC 11	Hand Tools	120
BC 12	Blueprint Reading	90
BC 13	Related Math	96
BC 14	Identification of Lumber	30
BC 15	Bench Work & Hand Operations	286
BC 16	Holding Devices & Fastening	25
BC 17	Hand & Power Sanding	20
	TOTAL	687

SECOND SEMESTER

No.	*Title*	*Hrs.*
BC 18	Portable Power Tools	118
BC 19	Production Jigs & Fixtures	60
BC 20	Assembly, Gluing & Clamping	280
BC 21	Stock Billing	36
BC 22	Wood Shop Machines	115
BC 23	Production Techniques	90
	TOTAL	699

CARPENTRY (CA)

This course provides instruction in the basic skills and fundamental knowledge required by the carpenter and mason in the construction of light frame and masonry buildings. This includes layout, foundations, formwork, framing and sheathing, exterior and interior trim, blockwork, brickwood, and concrete construction.

Related instruction includes the theory of carpentry and masonry, building tools and materials, blueprint reading, surveying, mathematics estimating, and safety.

After completing this course a student may enter the building industry as an advanced apprentice carpenter or mason; and, with experience, can advance to the position of journeyman or master carpenter or mason.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
TE 11	English	48
CA 10	Hand Tools	144
CA 11	Theory of Carp. Const.	48
CA 16	Safety Education	40
CA 12	Portable Tools-Wood Shop Machines	144
EL 12	Basic Wiring	96
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
CA 20	Advanced Hand and Mach. Op.	144
CA 21	Theory of Framing & Sheating	48
CA 22	Shop and Technical Math	48
CA 23	Block Construction	240
CA 24	Theory of Concrete Const.	40
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
CA 30	Blueprint Reading	48
CA 31	Surveying-Stake outs	96
CA 32	House Framing	144
CA 33	Brick Construction	192
CA 34	Methods of Brick & Block Construction	40
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
CA 40	Theory of the Steel Square	40
CA 41	House Construction	240
CA 44	Building Maintenance	96
CA 43	Int. Finish & Cab. Work	96
EC 11	Social Studies	48
	TOTAL	520

DIESEL MECHANICS (DM)

This course gives a thorough preparation for entering the diesel service field, such as heavy truck mechanics, construction equipment mechanics, and other areas on land and water where diesel engines are used.

The course prepares the student in learning service of diesel engines, and diesel powered equipment of many types. Training covers all phases of engine service and care and repair of the vehicles involved—both on and off-highway types.

More and more demand is made by the employer to supply his needs in trucking, construction work, and other fields where diesel power is used.

The diesel shop of the Community College is one of the best equipped in the eastern United States.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
DM 11	Hand, Machine Tools, and Bench Work	96
DM 12	Engine Principles	96
DM 15	Power Train	40
DM 16	Engine Maintenance	144
DM 18	Electrical Systems	144
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
DM 22	Engine Principles	48
DM 23	Combustion Fuels, and Injection Systems	96
DM 25	Power Train	96
DM 26	Engine Maintenance	136
DM 28	Electrical Systems	144
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
DM 33	Combustion Fuels, and Injection Systems	144
DM 36	Engine Maintenance	184
WE 03	Int. to Acet. Welding	96
WE 04	Int. to Elect. Welding	96
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
DM 44	Vehicle Maintenance	96
DM 46	Engine Maintenance	96
DM 47	Pumps & Accessories	280
EC 11	Social Studies	48
	TOTAL	520

ELECTRICAL CONSTRUCTION (EW)

This course is for the student who wants to work in the electrical trades but who does not have the ability or the desire to take the math and physics or to maintain the grades in electrical fundamentals which are required for the Associate Degree course. He would, however, take the same electrical subject courses as the degree students and this should give him enough background in the electrical or maintenance trades to be successful.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
GM 11	Arithmetic/Geometry	48
TE 11	English	48
EW 11	Direct Current Fundamentals	48
EW 12	Basic Wiring Lab.	96
EW 13	Direct Current Lab.	96
	Elective	184
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
GM 12	Algebra/Trigonometry	48
TE 21	English	48
EW 21	Alternating Current Fundamentals	48
EW 22	Alternating Current Lab.	96
ED 10	Basic Drafting Electronics (option)	140
	Elective	140
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
EC 11	Social Studies	48
EW 31	Basic Electrical Construction Lab.	96
EW 32	Industrial Electronics	48
EI 33	Basic Electronic Lab.	96
EW 34	Motor Control and Servomechanism Lab.	96
EW 35	Residential Wiring and Code	32
EW 36	Electrical Repair & Maintenance	96
	Elective	8
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
EW 41	Commercial & Industrial Wiring	96
ED 20	Electronic Drafting	144
EW 43	Advanced Maintenance & Repair	144
EW 44	Advanced Electrical Construction Lab.	136
	TOTAL	520

ELECTRICAL MOTOR REWINDING AND REPAIRING (EM)

This course is designed to teach the student to rewind electric motors of all kinds, as well as to make mechanical repairs on motors and other electrical machinery. The student also learns to do repair work on portable appliances and electrical equipment used in industry. Fundamentals of electrical theory, circuits, and industrial control wiring are also taught in this course.

Upon completion of this course, the student should be prepared to work in a commercial motor rewinding shop, to enter the appliance repair field, or to do electrical maintenance in industry. The ever-increasing use of motors and appliances and other electrical equipment means that job opportunities are constantly opening up in this field. This course should also be considered by older men who may need to change occupations because of physical disability or loss of former jobs due to automation.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
GM 11	Arithmetic/Geometry	48
EM 11	Direct Current Fundamentals	48
EM 12	Basic Wiring Lab.	96
EM 13	Direct Current Lab.	96
EM 18	Motor Rewinding	200
	Elective	32
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
GM 12	Algebra/Trigonometry	48
EM 21	Alternating Current Fund.	48
EM 22	Alternating Current Lab.	96
EM 25	Machine Shop Practice	100
EM 28	Motor Rewinding	200
	Elective	28
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
EC 11	Social Studies	48
EM 34	Motor Control & Servomechanisms Lab.	96
EM 35	Residential Wiring & Code	32
EM 36	Electrical Repair and Maintenance	96
EM 38	Motor Rewinding	200
	Elective	48
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
EM 45	Household Appliance Repairs	176
EM 46	Repair of Electrical Equip.	176
EM 48	Motor Rewinding	168
	TOTAL	520

HEAVY CONSTRUCTION EQUIPMENT OPERATION AND SERVICING (SO)

This course consists of the maintenance and servicing and operation of heavy construction equipment such as bulldozer, grader, roller, carry-all, scraper, ditcher, crane and shovel. The emphasis will be on repair and service to such machinery, but each qualified student will also learn the essentials of operation for all types of equipment. The student will become a practical craftsman in earthmoving.

Men who successfully complete the course will be qualified to enter the construction field as maintenance men, servicemen, or apprentice operators.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
SO 11	Hand, Machine Tools, and Bench Work	96
SO 12	Engine Principles	96
SO 13	Diesel Engine Maintenance	96
SO 15	Maintenance of Equipment	96
SO 16	Operation of Equipment	96
SO 17	Rigging, Hitches, and Slings	40
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
SO 22	Engine Principles	96
SO 23	Diesel Engine Maintenance	40
SO 25	Maintenance of Equipment	96
SO 26	Operation of Equipment	96
WE 03	Int. to Acet. Welding	96
WE 04	Int. to Elect. Welding	96
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
SO 33	Diesel Engine Maintenance	96
SO 34	Lubrication	96
SO 35	Maintenance of Equipment	96
SO 36	Operation of Equipment	136
SO 38	Electrical Systems	96
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
SO 44	Lubrication	96
SO 45	Maintenance of Equipment	144
SO 46	Operation of Equipment	144
SO 47	Rigging, Hitches, and Slings	40
SO 48	Electrical Systems	48
EC 11	Social Studies	48
	TOTAL	520

MACHINIST—GENERAL (MG)

The machinist course offers training on machine tools that are common to most machine shops. This course emphasizes skill on machines rather than academic subjects. The related subjects covered by this course include economics and the necessary mathematics to carry on in the machine industry.

Visual aids and theory will be provided in the shop theory room to cover all phases of the work. This in turn provides for class discussion on the various jobs, machines and operations in the shop.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
GM 11	Arithmetic/Geometry	48
MG 10	Bench Work	60
MG 11	Drill Press	52
MG 12	Engine Lathe	150
MG 13	Milling Machines	150
MG 14	Shaper	60
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
GM 12	Algebra/Trigonometry	48
EC 11	Social Studies	48
MG 20	Turret Lathe & Automatic Screw Machines	216
MG 21	Inspection & Blueprint Reading	208
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
MG 30	Bench Work	70
MG 31	Drill Press	20
MG 32	Jig Borer	60
MG 33	Engine Lathe	190
MG 34	Milling Machines	150
MG 35	Shaper	30
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
MG 40	Grinding Machines	380
MG 41	Heat Treating	140
	TOTAL	520

MECHANICAL DRAFTING (DC)

The objective of this course is to provide a broad and thorough knowledge of mechanical drafting and is designed to parallel industrial drafting as closely as possible.

The mechanical draftsman is responsible for the making of detail drawings for the purpose of conveying engineering ideas to the shop. From these detail drawings the actual parts may be manufactured in the shop.

A graduate can qualify as a draftsman for a variety of industrial and manufacturing establishments. For greatest success, a high school education or the equivalent, with an aptitude in spacial relations is necessary. With experience and continued study, graduates may rise to very responsible positions.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
DC 10	Basic Drafting I	228
DC 12	Basic Drafting II	228
GM 11	Arithmetic/Geometry	48
WP 01	Patternmaking	16
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
DC 20	Appl. Draft. Tech. I	252
DC 22	Appl. Draft. Tech. II	252
MG 01	Mach. Shop	16
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
DC 30	Mechanisms I	236
DC 32	Mechanisms II	236
GM 12	Algebra/Trigonometry	48
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
DC 40	Adv. Detailing	236
DC 42	Adv. Detailing & Layout	236
EC 11	Social Studies	48
	TOTAL	520

PRACTICAL NURSING (PN)

A program designed to meet the need in nursing service for a worker who will share in the giving of direct care to patients. It is intended for individuals who find satisfaction in performing nursing functions consistent with short term preparation and practicing nursing within a limited range of patient-care situations.

The pre-clinical phase of the program is given at The Williamsport Area Community College and consists of teaching basic nursing skills and the theory to effectively apply these skills.

The clinical phase of the program is spent at Divine Providence Hospital under the supervision of the clinical instructor employed by The Williamsport Area Community College. Here the student is brought in contact with real patient situations. Areas in which the student will practice are carefully selected to enable him or her to develop nursing skills, establish favorable nurse-patient relationships and to correlate the practice with the theoretical phase of the program.

REQUIRED FOR THE CERTIFICATE

Pre-Clinical Phase

No.	*Title*	*Hrs.*
PN 11	Personal Vocational Relationships	36
PN 12	Body Structure & Function	36
PN 13	Community Health-Personal Hygiene	36
PN 14	The Family	50
PN 15	Nutrition	50
PN 16	Nursing Principles & Practice	268
PN 17	Introduction to Illness	38
PN 18	Diversional & Rehabilitative Activities	16
PN 19	Supervised Study	75

Applied Learning Experiences

No.	*Title*	*Hrs.*
PN 21	Care of Medical & Surgical Patients	880
PN 22	Care of Mother & New Born Infants	240
PN 23	Care of Children	160

Total Length of Course 1875 Hours

OFFICE MACHINE REPAIRMAN (OR)

The office machine serviceman has interesting work, pleasant surroundings, and good opportunities in his field. Men with pleasing personalities and mechanical skills will find employment with manufacturers of office equipment, with appliance sale agencies or in opening their own small business.

The student in this course will be trained to perform periodic inspections, and to make repairs on different types of office equipment.

Men with various physical handicaps frequently find this field a good solution to their vocational problems. However, handicapped students should confer with the school or authorized vocational counselors before finally selecting the course.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
BS 10	Typing	48
OR 11	Intro. to Typewriters	100
OR 12	Machine Testing	90
OR 13	Theory	100
OR 14	Service Work	100
OR 15	Production Work	82
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
OR 21	Typewriter Sections	200
OR 22	Theory	92
OR 23	Electric Typewriters	132
GM 11	Arithmetic/Geometry	48
EC 11	Social Studies	48
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
OR 31	Intro. to Add. Machs.	64
OR 32	Appl. of Add. Mach.	64
OR 33	Surv. of Add. Mach.	120
OR 34	Adj. & Rep. of Add. Mach.	136
OR 35	Theory	88
TE 11	English	48
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
OR 41	Intro. to Dup. Mach.	90
OR 42	Oper. Dup. Mach.	102
OR 43	Ser. & Rep. Dup. Mach.	162
OR 44	Motor Circuits	70
OR 45	Off. Mach. Bus. Mgmt.	48
TE 21	English	48
	TOTAL	520

OFFSET PRINTING (OP)

The college offers a certificate in offset printing with emphasis placed on the area wherein the student shows special interest and aptitudes.

Successful completion of the certificate program leads to eventual placement in production positions in nearly all phases of photo-lithography. These encompass requirements necessary for the satisfactory performance of skills and background information of offset printing camera, press, layout, stripping, platemaking and composing departments.

Placement in these areas can be in commercial newspaper, publication, and container printing plants. Besides this vast array of opportunities, there are many attractive positions in advertising agencies and studios, and in-plant printing departments.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
MD 01	Mechanical Drawing	64
BS 10	Typing	48
OP 10	Reproduction Processes	16
OP 11	Photo Process I	128
OP 12	Offset Stripping I	128
OP 13	Platemaking	136
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
TE 11	English	48
OP 20	Copy Preparation I	96
OP 21	Photo Process II	112
OP 22	Cold Composition I	96
OP 24	Press Operation I	152
OP 25	Materials of Printing Production	16
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
EC 11	Social Studies	48
OP 30	Copy Preparation II	96
OP 31	Publication Photography	64
OP 32	Cold Composition	96
OP 33	Photo Composition	96
OP 34	Screen Process	120
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
OP 40	Bindery Methods & Procedures	64
OP 41	Photo Process III	112
OP 42	Offset Stripping II	112
OP 43	Direct Image	96
OP 44	Press Operation II	136
	TOTAL	520

PATTERNMAKING—WOOD (WP)

Patternmaking is the technique of preparing, shaping, or building wood and adaptable materials into models. These models are used in the foundry to make molds into which molten metal is poured to produce castings.

Patternmaking is a highly skilled craft and requires a great deal of accuracy. Because he learns the basic woodworking skills, a wood patternmaker can also qualify for skilled woodworking jobs, such as cabinetmaking and model making.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
M 11	Arithmetic/Geometry	48
ID 01	Mechanical Drafting	96
VP 10	Basic Patternmaking	192
VP 13	Basic Blueprint Reading I	48
VP 11	Machine Woodworking	40
VP 12	Pattern Construction I	96
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
GM 12	Algebra/Trigonometry	48
WP 20	Basic Patternmaking	192
WP 21	Basic Foundry Practice	40
WP 24	Advanced Blueprint Reading	48
WP 22	Basic Pattern Construction	96
WP 23	Basic Corebox Construction	96
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
VP 30	Advanced Foundry Practice	96
VP 31	Advanced Pattern Const.	192
VP 32	Advanced Corebox Const.	40
VP 33	Advanced Patternmaking	192
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
EC 11	Social Studies	48
WP 40	Advanced Pattern Const.	96
WP 41	Advanced Corebox Const.	192
WP 42	Advanced Patternmaking	184
	TOTAL	520

PLUMBING (PL)

Students in the plumbing course are first taught fundamentals, such as mathematics, blueprint reading, use of hand tools, pipe threading and fitting. Next the layout of soil, waste, and vent pipes are covered. Instruction on hot and cold water distribution for domestic use, sewage systems, and the maintenance of household and industrial plumbing completes the course.

Good employment opportunities are available with plumbing contractors, public utilities, aircraft, and ship-building industries.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
PL 11	Use of Tools, Plumbing Math, Etc.	224
PL 13	Building Maintenance (Basic)	114
PL 14	Lead Working (Basic)	96
PL 15	Steam Heating (Basic)	86
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs*
PL 21	Venting, Drainage (Basic)	16
PL 22	Blueprint Reading & Estimating	11
PL 23	Building Maintenance (Basic)	11
PL 24	Lead Working (Basic)	6
PL 25	Hot Water Heating (Basic)	6
	TOTAL	52

THIRD SEMESTER

No.	*Title*	*Hrs.*
PL 31	Water Distribution	160
PL 33	Building Maintenance (Advanced)	140
PL 34	Lead Working (Advanced)	108
PL 35	Steam & Hot Water Heating (Advanced)	112
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs*
PL 41	Venting, Drainage (Advanced)	9
PL 43	Building Maintenance	9
PL 44	Lead Wiping	14
WE 11	Acetylene Welding	14
WE 20	Electric Welding (Basic)	14
EC 11	Social Studies	4
	TOTAL	52

PRODUCTION ILLUSTRATION (PI)

The purpose of the production illustration course is to major in skills, basic knowledge, proper attitude, and to develop appreciation in the field of production illustration.

The course content is similar to the technical illustration course, with the exception of certain academic subjects which are deleted.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
PI 10	Drafting	228
PI 11	Rendering I	228
WP 01	Wood Patternmaking	16
GM 11	Arithmetic & Geometry	48
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
PI 20	Color	212
PI 21	Perspective	212
GM 12	Algebra & Trig.	48
EC 11	Social Studies	48
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
PI 30	Rendering II	220
PI 31	Axonometric Drawing	220
PI 32	Layout & Design	64
MG 01	Machine Shop	16
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
PI 40	Illustration Practice	220
PI 41	Technical Drawing	220
GA 10	Reproduction Process	16
GA 20	Copy Prep.	64
	TOTAL	520

SHEET METAL (SM)

More people are employed in metal working than in any other industry. Therefore, the definite need for trained sheet metal workers has never been greater.

Students interested in any of the various fields of employment that utilize sheet metal, will find this an excellent course. The objective of the sheet metal course is that all students acquire the basic skills and a thorough knowledge of all phases of sheet metal work. All the fundamentals of the trade are taught, including drafting, layout, design, fabrication, welding, construction, residential and commercial heating, estimating, cooling and ventilation.

Upon successful completion of this course, the student will be considered employable in various phases of sheet metal work, including the service trades, heating, air-conditioning ventilation, manufacturing, and construction, or with a minimum of capital and a little initiative, he may set up and maintain his own business.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
SM 10	Basic Fundamental Processes (Hand/Machine)	192
GM 11	Arithmetic/Geometry	48
SM 11	Sheet Metal Drafting	144
SM 12	Basic Commercial Sheet Metal	136
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hr*
GM 12	Algebra/Trigonometry	4
SM 20	Practical Pattern Drafting	14
SM 21	Construction (Service Trades)	19
SM 22	Sheet Metal Drafting	13
	TOTAL	52

THIRD SEMESTER

No.	*Title*	*Hrs.*
SM 30	Sheet Metal Welding	192
SM 31	Basic Commercial Sheet Metal	144
SM 32	Commercial Sheet Metal	144
SM 33	Roofing/Spouting	40
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hr*
EC 11	Social Studies	4
SM 40	Fabrication/Design	18
SM 41	Ventilation (Industrial/Residential)	19
SM 42	Sheet Metal Drafting (Advanced)	9
	TOTAL	52

SIGN PAINTING (SP)

The instruction offered in sign painting gives the student a broad background which will enable him to make a start in his own business or to work for a commercial sign shop.

The student is taught to visualize and sketch the design for any type commercial sign, to complete the sign in different media, and then to properly locate and install it.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	Title	Hrs.
E 11	English	48
P 11	Use and Care of Tools and Materials	16
P 12	Basic Alphabets	124
P 13	Letter Strokes	300
P 14	Sign Painting Safety	16
P 15	Theory and Tests	16
	TOTAL	520

SECOND SEMESTER

No.	Title	Hrs.
SP 21	Basic Brush Techniques in Tempra and Bulletin Colors	360
SP 22	Preparing Backgrounds	16
SP 23	Thumbnail sketches	144
	TOTAL	520

THIRD SEMESTER

No.	Title	Hrs.
E 01	Int. to Acety. Welding	96
E 02	Int. to Elect. Welding	96
P 31	Advanced SP Methods	152
P 32	Estimating	16
P 33	Scaling	16
P 34	Lettering on Glass	96
P 35	Intro. to Billboard Layout	48
	TOTAL	520

FOURTH SEMESTER

No.	Title	Hrs.
EC 11	Social Studies	48
SP 41	Billboard Pictorials	136
SP 42	Int. to Screen Process	48
SP 43	Metallic Leaf Application	96
SP 44	Shop Management	96
SP 45	Theory	48
SP 46	Intro. to Billboard Layout	480
	TOTAL	520

SURGICAL TECHNICIAN (ST)

A surgical technician is a selected lay person. Through a well-planned and well-organized course of instruction, she/he is prepared to function under the direct and continuous supervision of qualified professional nurses within hospital areas intimately concerned with the principles and practices of surgical asepsis, including operating rooms, sterilization and central supply service department.

REQUIRED FOR THE CERTIFICATE

Pre-Clinical			Supervised Clinical Experience		
No.	*Title*	*Hrs.*	*No.*	*Title*	*Hrs.*
ST 10	Professional Adjustments	30	ST 20	Major Surgery	345
ST 12	Anatomy and Physiology	75	ST 21	Minor Surgery	300
ST 13	Principles of Asepsis	50	ST 22	Cystoscopies	100
ST 14	Sterilization and Care of Supplies	65	ST 23	Housekeeping	200
ST 15	Operating Room Technique	130	ST 24	Sterilization and Care of Supplies	70

Total Length of Course 1365 Hours

TILE SETTING (TL)

This course includes the various methods of tile installation using the mastic, dry set Portland cement and conventional mortar methods.

Ceramic tile is being used in many modern homes, as well as in the modern industries and office buildings. It is time saving through cleanliness and appearance.

The linoleum craftsman phase includes the installation of resilient floor coverings.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
TL 11	Basic Fundamentals	96
TL 12	Tile Materials	32
GM 11	General Math	48
TL 13	Mastic Installation	120
TL 14	Building Maint.	224
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
TL 21	Basic Fundamentals	56
TL 22	Layout	32
TL 24	Building Maintenance	220
TL 25	Mosaic & Quarry Tile	196
TL 26	B/P Reading	16
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
TL 31	Estimating	60
TL 32	Conventional Mortar Methods	204
TL 34	Bldg. Maintenance	180
TL 35	Dry Set Portland Cement Method	76
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
EC 11	Social Studies	48
TL 42	Basic Fundamentals	65
TL 43	Sheet Goods	190
TL 44	Resilient Tile	185
TL 45	Estimating	32
	TOTAL	520

WELDING (WE)

The objective of the Welding Certificate program is to train students to become competent welders. Proficiency is stressed in Electric, Oxy-Acetylene and Inert Gas shielded welding processes. Welding has become a very important factor in our national economy and is not only used in manufacturing, but also as a maintenance tool to keep our industries functioning. There is an increasing demand for well-trained, competent welding operators.

REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
WE 11	Acetylene Welding (Position)	240
WE 12	Alloy Welding & Brazing	118
WE 13	Pipe Welding	144
WE 14	Acetylene Cutting	6
WE 15	Weld Testing	12
	TOTAL	520

SECOND SEMESTER

No.	*Title*	*Hrs.*
WE 20	Electric Welding (Position)	340
WE 21	Pipe Welding	108
WE 22	Cast Iron Welding	12
WE 23	B/P Reading & Layout	48
WE 24	Weld Testing	12
	TOTAL	520

THIRD SEMESTER

No.	*Title*	*Hrs.*
WE 30	Acetylene & Advanced Aircraft	102
WE 31	Inert Gas Shield Arc. (MIG) (TIG)	358
WE 37	Weld Testing	12
GM 11	Arithmetic/Geometry	48
	TOTAL	520

FOURTH SEMESTER

No.	*Title*	*Hrs.*
WE 40	Electric Welding (Code)	430
WE 41	Sheet Metal Welding	30
WE 47	Weld Testing	12
EC 11	Social Studies	48
	TOTAL	520

WOODWORKING MACHINE OPERATING (MO)

A student enrolled in this course will receive the basic training that is essential in the operation of woodworking machinery.

In order for the student to meet the standards of production, high quality performance of work and production is stressed in this program.

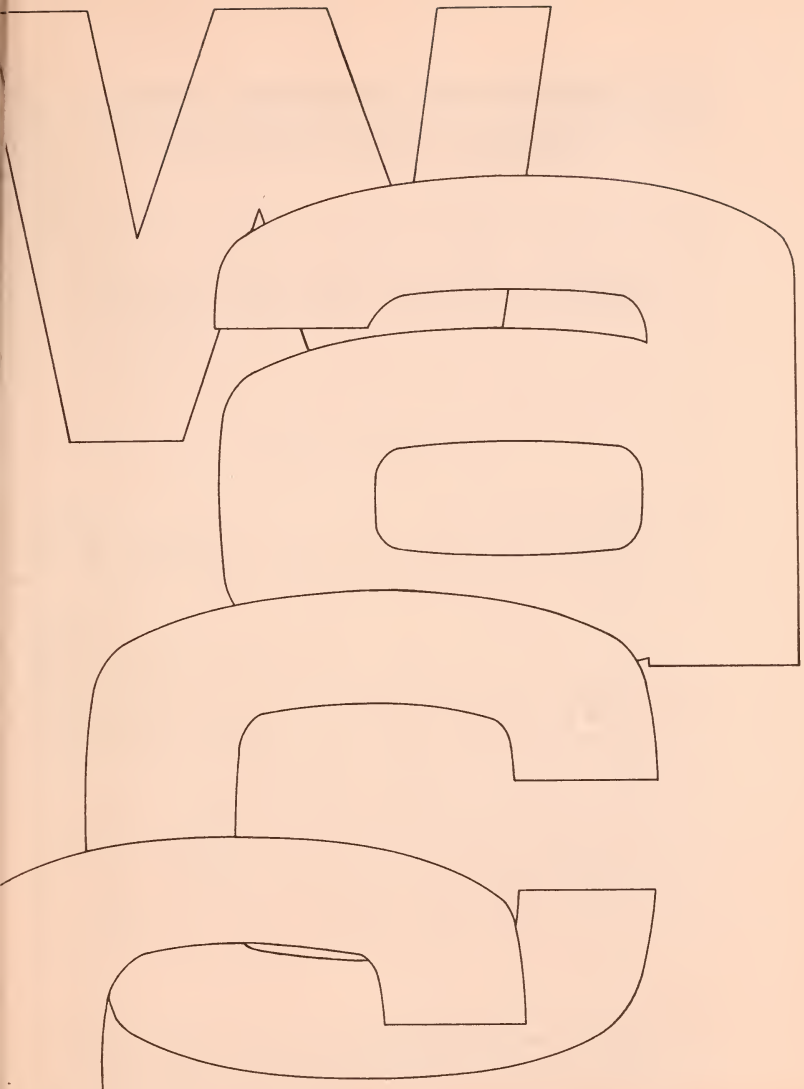
REQUIRED FOR THE CERTIFICATE

FIRST SEMESTER

No.	*Title*	*Hrs.*
MO 10	Safety Ed. & Lumber Veneers Plywood	48
MO 11	Hand Tools	48
MO 12	Blueprint Reading Shop, Drawings & Layout	48
MO 13	Shop Math	48
MO 14	Hand Operations	48
MO 15	Fastening & Holding Device	16
MO 16	Portable Power Tools	48
MO 17	Power Sanding	16
MO 18	Production Jigs & Fixtures	176
MO 19	Assembly, Gluing, & Clamping	32
	TOTAL	528

SECOND SEMESTER

No.	*Title*	*Hrs.*
MO 20	Stock Billing	16
MO 21	Wood Shop Machines	144
MO 22	Production Techniques	48
MO 23	Moulder Set-Up	96
MO 24	Tennenor Set-Up	16
MO 25	Mortising	16
MO 26	Machine Production	144
MO 27	Knife Grinding & Layout	48
	TOTAL	528



Course Description

THE WILLIAMSPORT AREA COMMUNITY COLLEGE

SCHOOL OF APPLIED ARTS AND SCIENCES

COURSES OF STUDY

AA 30 AERODYNAMICS 40 Hours

Nomenclature of the airplane. Elementary and advanced theory of flight. Airfoil sections and controls, their effect on flight. Aircraft stability and flight characteristics. Balance in aircraft, its effect on stability.

AA 31 AIRCRAFT SYSTEMS 48 Hours

Hydraulics. Principles of hydraulics. Types of approved hydraulic fluids. Shock absorbing systems, types, installation, maintenance and inspection. Oleo landing gear, types and servicing. Actuating cylinders and their adjustment. Types of hydraulic pumps and valves. Types of hydraulic brake systems, vented and sealed pressure type. Construction of master cylinders, wheel brake cylinders. Bleeding hydraulic systems, methods. Pressure accumulators, unloading valves. Types of selector valves. Trouble shooting on hydraulic systems. Compliance with service bulletins and FAA Airworthiness Directives.

Fuel systems. Aircraft fuels, grades, identification. Types of selector valves. Types of fuel pumps, engine driven and hand wobble pump. Kinds of fuel systems, pressure and gravity. Pressure relief valves installation and adjustment. Fuel line installation, bending, attachment, size and capacity. Types of fuel hose used in aircraft. Hose clamps, attachment, safety sediment drains. Fuel tank construction, installation, ventillation, draining and inspection. Fuel gauges, types, tank filler caps, placarding for grade of fuel and content. Auxiliary or reserve tank installations, regulations. Placarding fuel valve for takeoff conditions and cruise. Regulations on size of tank per H. P., size of lines for required fuel flow.

AA 32 AIRCRAFT WOODWORKING 70 Hours

Kinds of approved woods used in aircraft construction, how they are identified. Inspection of wooden structures, causes for rejection. Drying and storing wood. Steaming and bending wood. Plywood and its use in aircraft construction. Kinds of glue and their preparation, approved brands. How to glue wood, procedures used, mixing precautions. Grain in wood, when acceptable, when to reject. Care and use of tools used in aircraft woodworking. Splicing and gluing wood spars and ribs. Assembly procedures, pressing, clamping and

drying time. Static testing glue joints. Stressed wood skin fuselage, wings and control surfaces. Repairs permitted on wood structures, stressed skin covering. Construction repair and replacement of wood spars and leading edge. Checking alignment in wood structures, methods used. Protective materials and application.

AA 33 FABRIC COVERING, DOPING AND FINISHING 170 Hours

Identification of materials used in fabric covering. Approved use of fiberglas and dacron materials. Estimating material required for covering wings, fuselage and controls. Cutting, fitting fabric for fuselage, wings and control surfaces. Thread, cord and tapes. Selection and application. Machine sewing, hand sewing, tacking. Approved methods of fastening. Hand rib stitching, type of approved knot, spacing requirements. Types of approved machine sewed seams. Inspection before covering. Location of inspection openings, number required. Selection and application of approved protective materials. Covering plywood with fabric, purpose, methods used. How to set up spraying equipment, pressure tank and suction cup methods. Use and care of spraying equipment, guns, and containers. Adjustment of spray guns, proper size air caps for dope and enamels. Standard dope finishes. Approved primers, dope proofing. Application of dope by hand brushing, purpose of brushing. Use of sandpaper, range of grits available, wet and dry paper, wet sanding procedures, purpose. Layout of registration numbers, masking procedures, regulations on size and location. Mixing pigmented dopes for spraying. Methods of combating humidity, its effect on dopes and lacquers. Anti-blush reducers and retarders. Bleeding through finishes, its cause and prevention. Rejuvinating, methods and purpose, procedures. Application of protective materials, purpose. Rubbing compounds, approved types, use and purpose. Approved cleaners for fabric finishes, recommended brands, precautions in use.

AA 34 AIRCRAFT WELDING 144 Hours

Proper use and care of welding equipment. Limitations for use of electric welding. Properties of metals. Identification of aircraft structural steel tubing. Selection of welding materials, types of flux to use, types of welding rod. Preparation of materials for welding. Acetylene welding procedures and practice. Identification of welding flames. Peneration and fusion of welds, appearance of satisfactory welds. Types of welded joints, fillet, butt, spot, rosette and tack welds. Types of approved splices, insert sleeve, fish-mouth, angular sleeve. Inspection of welded joints, hot, cold, burned welds. Cutting, fitting, welding, fabrication structural tubing from drawings. Regulations pertaining to replacement of damaged steel tubing. Fabrication, assembly and alignment of tubular structures. Warping, its cause and prevention. Brazing, materials limited to brazing, limitations in aircraft. Use of jig, trammel points, levels, plumb bobs and protractors. Protective materials and finishes, purpose, selection and proper application.

AA 40 AVIATION SHEET METAL 220 Hours

Identification of sheet metals, steel, aluminum alloy, magnesium, titanium. Protective materials, selection and application, interior and exterior. Aluminum alloys, strength, weight, use in aircraft. Heat treated sheet metals, their identification and use. Types of heat treatment, testing, Rockwell, Brinell. Hand tools and equipment used in fabrication of sheet metal, use and care. Cutting, forming, fitting, bending, fabricating stressed skin sections. Prohibited practice on aluminum alloys and steel. Limitations on repairs to aluminum alloy fittings. Precautions to be observed when attaching aluminum sheet to steel. Corrosion, causes and prevention. Types of corrosion, detection. Repair and replacement of stressed skin metal covering. Methods and procedures of attachment to structures. Temporary and permanent type of fastening. Identification of rivets,

AN numbering system, select use of different types, regulations on shear strength. Rivets: alloys, heat treated, storage, use and care. Layout of sheet metal patterns. Cutting, forming sheets, bulkheads, etc. Drilling, burring, filing cut edges and holes. Bend allowance, its importance in sheet metal work. Forming aluminum, use of cornice brake, gap shear, bar folder, heading pools, forming tools, shrinker and stretcher, etc. Regulations on edge distance for rivets, spacing, head diameters, thickness. Hand riveting, types of rivet guns, sets, bucking bars. Installing rivets, when used, kinds approved, method of installation. Riveting procedures, order of installing rivets. Inspection of riveted joints, causes for rejection. Method of removing defective rivets, precautions. The methods of dimpling, bucking bars. Methods of countersinking, reasons for its use when necessary. Cutting, forming, drilling and aligning for riveting. Repair and maintenance of fuel and oil tanks. Firewall installations, acceptable materials, reasons. Repair and maintenance of cowling, fairings, regulations on repairs. Floats and hulls, construction, repair and maintenance. Cleaning aluminum, procedures, care and selection of materials.

AA 41 RIGGING AND ASSEMBLY 212 Hours

AN numbering system for aircraft hardware, bolts, nuts, washers, etc. Rigging procedures for monoplanes, methods, specifications. Rigging procedures for bi-planes, control systems, methods, specifications. Equipment, instruments, tools required for rigging, and their use. Safety methods on turnbuckles, castle nuts, fittings. Corrections for faulty flight conditions, wing heaviness, tail heaviness. Trim tabs, their effect on flight. Installation and inspection. How to level an airplane. Leveling means, specifications, how obtained. Weighing the aircraft. Calibrating the scales, tare. Weight and balance computations, importance. Installation and removal of items of equipment, the effect on weight and balance. Empty weight center of gravity. Where located, reference means. Forward and rearward loading conditions, computations. Installation of plexiglas windshields and windows, cutting, fitting, drilling. Installation and fitting of fairings, procedures.

Types of aircraft instruments, installation, reading corrections, placarding. Marking instruments for limits of operation, purpose. Installation of gyro instruments, venturi's, suction gauges. Testing of instruments with portable instrument test set. Installation of floats and skiis. Regulations pertaining to loads. Cabin heaters, installation, operation, inspection, and repair. Safety belt requirements, installation, testing, inspection. Removal and installation of tires, wheels, bearings, servicing and inspection.

AA 42 AIRCRAFT ELECTRICAL SYSTEMS 30 Hours

Elementary theory of electricity. Wiring diagrams, symbols. Tracing circuits. Theory and instruction in the use of ohm meters. Wiring installations, bonding, conduits, materials used, precautions. Storage batteries, servicing with acid, charging. Battery boxes, drains, acid-proofing structures. Landing lights, navigation lights, flares, installation, repair and maintenance. Installation and adjustment of microswitches on landing gear and flaps. Circuit breakers, fuses, solenoids, voltage regulators, generators and starters, installation and inspection. Installation of anti-collision lights, electrical load analysis. Installation and inspection of retraction systems for landing gear and flaps. Specifications for travel limits.

AA 43 FEDERAL AIR REGULATIONS 18 Hours

Requirements for a mechanic certificate, ratings available, education, age, citizenship. Duties and responsibilities of the mechanic, limits. FAA forms required for a periodic inspection, when required. Requirements on forms and procedures when completing a major repair or alteration. Proper log book entries, who is responsible, signatures, ratings. Registration certificates, how

obtained. Requirements for experimental aircraft, home built, commercial. FAA manuals required for mechanics. FAA regulations pertaining to major repairs of the airframe structure.

FINAL EXAMINATION

To be given to each student successfully completing each phase of the Airframe Mechanics course. A minimum passing grade of 70% is required in each phase of the course before a graduation certificate will be issued.

AB 11 HAND, MACHINE TOOLS, AND BENCH WORK 48 Hours

Learning to use common tools and special tools of the trade, bench and machine tools for tapping, threading, reaming, grinding, honing, lapping, and measuring.

AB 13 BODY AND CHASSIS 96 Hours

Body repairs such as rattles, squeaks, leaks, etc. Servicing of various power operated accessories such as windows, convertible tops, seats, heaters, defrosters, etc. Repair of exhaust system shock absorber service and other service items pertient to body and/or chassis.

AB 16 SANDING 48 Hours

The use of sanding discs and all types of sand paper in straightening rough metal, filled surfaces, rough sanding undercoats, preparing "old finishes" and finish sanding.

AB 17 MASKING 48 Hours

Proper procedures and uses of all sizes of masking tape by hand and with masking or taping machines.

AB 18 METAL WORKING 88 Hours

Rough out damaged sections by pushing or pulling, etc. Hammer and dolly straightening; shrinking; stretching, and forming metal. Straightening metal with body file or disc grinder and pick hammer.

AB 22 FRONT SUSPENSION 48 Hours

Complete servicing, repair, and adjustment of front suspension (and rear, where applicable) systems. Wheel balancing. Power steering services and repairs.

AB 23 INTERIOR TRIM 96 Hours

How interior trim of a car is removed and installed including glass mounted solid, door glass and windshields. The use of all types of cements and sealers used in auto maintenance. How to locate and repair water leaks, squeaks, and rattles.

AB 24 PANEL INSTALLATION 48 Hours

Making repairs where complete damage prevails, such as in wrecks where tops, quarter panels, fenders, hoods, doors, etc. are damaged beyond practical repair. Making repairs where complete damage prevails due to rust and corrosion, such as rocker panels, sections of fenders and quarter panels, etc.

AB 25 USED CAR RECONDITIONING 96 Hours

The procedure used to clean up used cars as to motor and luggage compartments, interior and exterior finish to make cars saleable.

AB 26 SANDING 96 Hours

The use of sanding discs and all types of sand paper in straightening rough metal, filled surfaces, rough sanding undercoats, preparing "old finishes" and finish sanding.

AB 27 MASKING 40 Hours

Proper procedures and uses of all sizes of masking tape by hand and with masking or taping machines.

AB 28 METAL WORKING 96 Hours

Rough out damaged sections by pushing or pulling, etc. Hammer and dolly straightening; shrinking, stretching, and forming metal. Straightening metal with body file or disc grinder and pick hammer.

AB 30 COLOR MATCHING 40 Hours

The use of tinting colors and their effect on the original color shade. To make up a complete color. The use of paint manufacturers color matching books. How to apply stripes and the use of stencils and lettering colors. The proper selection of brushes.

AB 31 FILLING 96 Hours

How to tin and lead damaged areas. The use and application of plastic fillers. The use and time to use body putty. The procedure used in finishing these materials for primer-surfacer application.

AB 32 PANEL INSTALLATION 48 Hours

Making repairs where complete damage prevails, such as in wrecks where tops, quarter panels, fenders, hoods, doors, etc. are damaged beyond practical repair. Making repairs where complete damage prevails due to rust and corrosion, such as rocker panels, sections of fenders and quarter panels, etc.

AB 36 SANDING 48 Hours

The use of sanding discs and all types of sand paper in straightening rough metal, filled surfaces, rough sanding undercoats, preparing "old finishes" and finish sanding.

AB 38 METAL WORKING 96 Hours

Rough out damaged sections by pushing or pulling, etc. Hammer and dolly straightening, shrinking, stretching, and forming metal. Straightening metal with body file or disc grinder and pick hammer.

AB 39 PAINTING 192 Hours

The uses of all types of paints such as undercoats, sealers, enamel, lacquers and acrylic lacquers. The types of thinners and reduction percentages. The use of fish-eye eliminators and anti-wrinkle reducer. The spraying of finish coats in lacquers and enamel in spot or complete refinish work. The use of rubbing compounds, polishes, and wax by hand and electric polisher.

AB 40 COLOR MATCHING 48 Hours

The use of tinting colors and their effect on the original color shade. To make up a complete color. The use of paint manufacturers color matching books. How to apply stripes and the use of stencils and lettering colors. The proper selection of brushes.

AB 41 ESTIMATING DAMAGE 96 Hours

The use of crash books and the systems used to determine the exact cost of any job entering the body shop.

AB 42 PANEL INSTALLATION 48 Hours

Making repairs where complete damage prevails, such as in wrecks where tops, quarter panels, fenders, hoods, doors, etc. are damaged beyond practical repair. Making repairs where complete damage prevails due to rust and corrosion, such as rocker panels, sections of fenders and quarter panels, etc.

AB 44 ELECTRICAL SYSTEM 48 Hours

Service and repair of generators, regulators, motors, batteries and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

AB 46 SPECIAL TOOLS AND EQUIPMENT 48 Hours

The tools and equipment necessary to maintain a body shop. The use and care of all equipment. The materials used and their procurement.

AB 48 METAL WORKING 40 Hours

Rough out damaged sections by pushing or pulling, etc. Hammer and dolly straightening, shrinking, stretching, and forming metal. Straightening metal with body file or disc grinder and pick hammer.

AB 49 PAINTING 144 Hours

The uses of all types of paints such as undercoats, sealers, enamel, lacquers and acrylic lacquers. The types of thinners and reduction percentages. The use of fish-eye eliminators and anti-wrinkle reducer. The spraying of finish coats in lacquers and enamel in spot or complete refinish work. The use of rubbing compounds, polishes, and wax by hand and electric polisher.

AM 11 HAND MACHINE TOOLS, AND BENCH WORK 96 Hours

Learning to use common tools and special tools of the trade, bench and machine tools for tapping, threading, reaming, grinding, honing, lapping, and measuring.

AM 12 ENGINE SERVICE 280 Hours

Learning nomenclature, relation of parts and assemblies, measuring, installing, fitting of pistons, piston pins and rings, bearings, etc. Oiling system. Aligning connecting rods. Servicing components, timing settings.

AM 18 ELECTRICAL SYSTEM 96 Hours

Service and repair of generators, regulators, motors, batteries, and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

AM 22 ENGINE SERVICE 240 Hours

Learning nomenclature, relation of parts and assemblies, measuring, installing, fitting of pistons, piston pins and rings, bearings, etc. Oiling system. Aligning connecting rods. Servicing components, timing settings.

AM 23 POWER TRAIN 96 Hours

Trouble shooting, installation, and adjustment of clutches. Diagnosis and repair of standard units and overdrive, servicing of same. Theory, construction and operation of automatic units; adjustment of same, and where advisable, the repair and rebuilding of automatics. Servicing of automatic transmissions. Service and repair of universal joints, rear wheel bearings and seals.

AM 25 DIFFERENTIALS 40 Hours

Service and repair of differential units, including interlocking types.

AM 26 BRAKES 144 Hours

Complete modern brake servicing—lining, bleeding, adjusting, etc. Repair of master and wheel cylinders and other hydraulic components. Power brake service.

AM 34 FRONT SUSPENSION 136 Hours

Complete servicing, repair, and adjustment of front suspension (and rear, where applicable) systems. Wheel balancing, power steering services and repairs.

AM 37 BODY AND CHASSIS 96 Hours

Body repairs such as rattles, squeaks, leaks, etc. Servicing of various power operated accessories such as windows, convertible tops, seats, heaters, defrosters, etc. Repair of exhaust system, shock absorber service, and other service items pertinent to body and/or chassis.

AM 38 ELECTRICAL SYSTEM 96 Hours

Service and repair of generators, regulators, motors, batteries, and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

AM 40 TUNE-UP 136 Hours

Use of modern scientific test equipment in setting up fuel and ignition for top performance. Same for generating system. Diagnosing engine condition by "reading" instruments, spark plugs and other tell-tale signs.

AM 41 TROUBLE SHOOTING 96 Hours

Diagnosis of troubles in engine, chassis or other units by specific methods of deduction by elimination. Learning to do this rapidly and accurately.

AM 48 ELECTRICAL SYSTEM 96 Hours

Service and repair of generators, regulators, motors, batteries, and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

AM 49 FUEL SYSTEMS 192 Hours

Cleaning and rebuilding carburetors; adjusting same. Use of modern test and service equipment. Test and repair of fuel pumps.

AP 10 POWERPLANT THEORY 90 Hours

Principles of operation, design and construction. History of engine development, basic heat engines. Theory of operation of the four stroke cycle engine. The engine and its parts, nomenclature. Heat energy conversion to useful power. Horsepower calculation. Cubic inch displacement. Factors effecting power output. Transmission of power, gears, gear ratio, and gear reduction. Theory of operations and fundamental principles of turbojet, turbo prop, and turbo compound engines. Basic engine designs as to cylinder arrangement, cylinder construction and materials. Crankshaft design, crankcase design, piston assy. design, articulating rod assy. design, accessory drive gears design and construction.

AP 11 DISASSEMBLY, OVERHAUL, AND ASSEMBLY 96 Hours

Disassembly procedure on Class 1 engines, description and study of parts. Nomenclature and function of parts, valves and valve action. Study of all parts —rotating, reciprocating and stationary. Use of manufacturers overhaul manual. Overhaul procedures, cylinder removal, rework and installation, refacing valves. Fitting piston rings, crankshaft overhaul, valve mechanism overhaul. Cleaning methods and procedures, bearings, oil seals, engine assembly. Timing valves, timing magnetos, accessory installation. Methods of torqueing and safety wiring. General procedures of all engine repairs, replacement of parts and certification of conformity and historical record entry.

AP 12 CARBURETION SYSTEMS 80 Hours

Carburetors, fuel injectors, supercharger systems, fuels and fuel systems. Carburetion, theory and principles. Float and pressure carburetors. Fuel injectors and their construction, operation, repair, maintenance and adjustment and inspection. Effect on carburetion by variables in temperature and humidity. Induction systems—types, construction, operation, repair and inspection. Trouble shooting, failures and corrective measures. Carburetor and injector nomenclature, purpose and function of each part. Theory and principles of supercharging. Types of superchargers, operation, construction and maintenance of internal superchargers. Operation, construction and maintenance of turbo superchargers, nomenclature of supercharger units. History of powerplant fuels. Types of fuels, octane rating, fuel specifications, effects of fuels on engine performance. Basic fuel system design, fuel pumps, types, adjustment, repair. Selector and cross feed valves. Operation and engine starting procedures.

AP 13 ELECTRIC SYSTEMS 72 Hours

Ignition and electric systems, starters, generators and regulators. Theory of electricity, theory of electricity as applied to ignition systems. Magneto ignition—high and low tension. Battery ignition. Types of magneto ignition systems—their construction, operation, installation, maintenance, repair and inspection. Ignition systems, parts, and nomenclature. Boosters and induction vibrators. Magneto overhaul, care and maintenance. Ignition systems, timing, and synchronization. Spark plugs, types, adjustment, maintenance and inspection. Electrical load analysis. Installation of units in electric systems. Circuit protection. Use of test equipment. Volt-Ohmeter; starters—types, construction, installation, operation, repair and inspection. Overhaul of geared and direct drive starters. Solenoids, installation and operation. Generators—types, purpose, operation, installation, maintenance, repair and inspection. Overhaul of generators—bench test generators, starters, and voltage regulators. Adjustment of vibrating and carbon pile regulators. Generator and regulator circuitry. Batteries—construction, installation, care and maintenance.

AP 14 INSPECTION AND MAGNAFLUX 24 Hours

Inspection procedures, charts, and recording. Theory of Magnaflux inspection. Magnetic inspection of ferrous parts. Amperage and procedure for various sizes and shapes of parts. Demagnetizing. Zyglo method inspection of nonferrous parts. Tools and equipment for dimensional inspection. Cylinder bore gauge and micrometer reading. Manufacturers table of limits.

AP 15 LUBRICATION AND OILING SYSTEMS 48 Hours

History and theory of lubricants. Development and refining of oils, types, and grades. Oil specifications. Viscosity index, pour point, flash point. Synthetic and ashless dispersent oils. Lubrication systems—hopper, dry sump, wet sump, pressure and splash. Lubrication systems in radial, inverted, and opposed engines. Trouble shooting. Lines, hose, connections, tanks, drains, vents, filters, their requirements and specifications. Heating and cooling. Radiators, lagging,

inspection, repair and maintenance. Oil dilution systems. Pressure relief valves —types, location, function. Specifications of oils and pressures by manufacturers. Pumps—types, installation, location, construction and inspection.

AP 16 OPERATION AND TROUBLE SHOOTING 62 Hours

Line service, run up checks, and procedures. Magneto check, drop off, recognition of ignition malfunction and systematic elimination of trouble. Fuel system troubles, compression check and elimination of trouble. Lubrication systems problems—causes and remedies. Manufacturer limitations, cold weather starting and stopping procedures.

AP 21 INSPECTION AND MAGNAFLUX 24 Hours

Inspection procedures, charts, and recording. Theory of Magnaflux inspection. Magnetic inspection of ferrous parts. Amperage and procedure for various sizes and shapes of parts. Demagnetizing. Zyglo method inspection of nonferrous parts. Tools and equipment for dimensional inspection. Cylinder bore gauge and micrometer reading. Manufacturers table of limits.

AP 22 CARBURETION SYSTEMS 32 Hours

Carburetors, fuel injectors, supercharger systems, fuels and fuel systems. Carburetion, theory and principles. Float and pressure carburetors. Fuel injectors and their construction, operation, repair, maintenance and adjustment and inspection. Effect on carburetion by variables in temperature and humidity. Induction systems — types, construction, operation, repair and inspection. Trouble shooting, failures and corrective measures. Carburetor and injector nomenclature, purpose and function of each part. Theory and principles of supercharging. Types of superchargers, operation, construction and maintenance of internal superchargers. Operation, construction and maintenance of turbo superchargers, nomeclature of supercharger units. History of powerplant fuels. Types of fuels, octane rating, fuel specifications, effect of fuels on engine performance. Basic fuel system design, fuel pumps, types, adjustment, repair. Selector and cross feed valves. Operation and engine starting procedures.

AP 23 POWERPLANT MAINTENANCE 72 Hours

Engine inspection procedures, daily check, preflight check, 25, 50, and 100 hour inspections. Historical records. Oil change. Engine specifications and operation. Fuel system inspection, ignition system check, compression check, lubrication system check, inspection of exhaust system, heaters and accessories. Engine Airworthiness Directives. Propeller, cowling and control inspection, Engine Tuneup. Top overhaul, safety of parts.

AP 24 POWERPLANT INSTRUMENTS 16 Hours

Engine instruments—operation, construction, care and maintenance. Tachometers, pressure gauges, temperature gauges. Fuel air ratio indicators, exhaust temperature indicators, fuel quantity gauges. Aneroids, bourdon tubes, thermocouples and calibrated leads.

AP 25 BLOCK TESTING 24 Hours

Engine run-in procedures. Installation of engine for test. Cooling problems in test running. Power output calculations.

AP 26 ELECTRIC SYSTEMS 72 Hours

Ignition and electric systems, starters, generators and regulators. Theory of electricity, theory of electricity as applied to ignition systems. Magneto ignition—high and low tension. Battery ignition. Types of magneto ignition systems — their construction, operation, installation, maintenance, repair and inspection. Ignition systems, parts, and nomenclature. Boosters and induction

vibrators. Magneto overhaul, care and maintenance. Ignition systems, timing, and synchronization. Spark plugs, types, adjustment, maintenance and inspection. Electrical load analysis. Installation of units in electric systems. Circuit protection. Use of test equipment: Volt-Ohmeter; starters—types, construction, installation, operation, repair and inspection. Overhaul of geared and direct drive starters. Solenoids, installation and operation. Generators—types, purpose, operation, installation, maintenance, repair and inspection. Overhaul of generators—bench test generators, starters, and voltage regulators. Adjustment of vibrating and carbon pile regulators. Generator and regulator circuitry. Batteries—construction, installation, care and maintenance.

AP 27 PROPELLERS 96 Hours

Blade element theory and nomenclature of propellers. Types, wood, fixed pitch metal, constant speed, and full feathering. Theory of electric and hydraulically operated reversing propellers. Propeller governors and synchronization, R. P. M. and H. P. ratings, limitations and specifications. Operating maintenance and servicing of propellers. Inspection, local etching and chromic acid anodyzing and magnetic particle inspection. Propeller static balance and dynamic balance. Maintenance and adjustment and operation of constant speed governor. Alterations, repairs and inspection regulations as recommended by manufacturer. Tools and equipment necessary to make permissible repairs to propellers and blades. FAA propeller specifications and Airworthiness Directives. Regulations as to causes for rejection of wood and metal propellers. Propeller tracking and installation. Engine mechanics responsibilities and limitations pertaining to propeller repairs and maintenance.

AP 28 FEDERAL AIR REGULATIONS 16 Hours

Permissible repairs to different classes of power plants. FAA forms. Historical record entries. Airworthiness Directives compliance. Specification sheets. Privileges and responsibilities of the powerplant mechanic.

AP 29 POWERPLANT INSTALLATION 20 Hours

Installation of radial, inline, and horizontally opposed engines. Installation of mounts, exhaust systems, baffles, fuel and oil lines, engine controls, propeller controls. Inspection of installation. Installation of cowling, care and inspection of cowling.

FINAL EXAMINATION

To be given to each student successfully completing each phase of the Powerplant Mechanics course. A minimum passing grade of 70% is required in each phase of the course before a graduation certificate will be issued.

AT 10 BASIC ARCHITECTURAL DRAFTING FUNDAMENTALS
1 Credit—16 Hours

The fundamentals in lettering, use of instruments, orthographic projection, sectioning, geometrical construction, intersections, use of the architect's and engineer's scales, and introduction to the various drafting materials and media.

AT 10L BASIC ARCHITECTURAL DRAFTING LABORATORY
3 Credits—144 Hours

Laboratory in which the student puts into practice the fundamentals described above.

AT 11 STRUCTURES I 3 Credits—48 Hours

STRENGTH OF MATERIALS—The study of the physical properties of materials as applied to their design. Stresses in beams, elastic curves, deflection, columns and eccentric loads.

TIMBER DESIGN—Unit stresses, working stresses for structural timber, design of beams, notched beams, joists and rafters, plank and laminated floors, laminated beams, laminated arches, wood columns, trussed rafters, and plywood beams and trusses.

AT 20 ARCHITECTURAL DETAILING 2 Credits—96 Hours

The principles and practices in detailing and drafting the common materials and elements with emphasis on practical applications.

AT 21 ARCHITECTURAL GRAPHICS 2 Credits—32 Hours

The study of shades and shadows, delination and practical construction of perspectives and models, rendering in various media.

AT 22 ARCHITECTURAL GRAPHICS LABORATORY 3 Credits—144 Hours

Laboratory in which the student puts into practice the fundamentals described above.

AT 23 ARCHITECTURAL HISTORY 2 Credits—32 Hours

A study of the basic orders and the history of architecture through the present.

AT 31 RESIDENTIAL DESIGN FUNDAMENTALS 2 Credits—32 Hours

Theory of residential design fundamentals including sketching, drafting preliminary plans and working drawings.

AT 32 RESIDENTIAL DESIGN LABORATORY 3 Credits—144 Hours

Laboratories in which the student puts into practice the fundamentals described above.

AT 33 STRUCTURES II 4 Credits—64 Hours

REINFORCED CONCRETE DESIGN—The theory and design of concrete beams, columns, footings, slabs and retaining walls. Masonry and pre-stressed concrete design.

TRUSS DESIGN—Graphic statics, stresses in roof trusses, design of steel and wood trusses.

STEEL DESIGN—Design of structural elements including beams, columns, plate girders, bearing plates, trusses and beam connections. The use of the AISC Handbook.

AT 34 BUILDING MATERIALS AND METHODS 3 Credits—48 Hours

The study of typical building materials, their production, forms, properties, use and performance when used in various combinations.

AT 40 FUNDAMENTALS OF DESIGN—COMMERCIAL, INDUSTRIAL, RELIGIOUS 2 Credits—32 Hours

The fundamentals of design of commercial, industrial, and religious structures; including preliminary plans and working drawings.

AT 41 COMMERCIAL, INDUSTRIAL, RELIGIOUS BUILDING DESIGN LABORATORY 4 Credits—192 Hours

A laboratory in which the student puts into practice the fundamentals described above.

AT 42 MECHANICAL AND ELECTRICAL EQUIPMENT OF BUILDINGS 3 Credits—48 Hours

A study of the fundamentals of heating and ventilation of buildings. Study of the mechanical equipment and the various mechanical systems that constitute

a necessary part of the modern building. Also a study of sanitation, plumbing fixtures, materials, sewage systems and their lay-out, state and national codes. Illumination, lighting theory, fundamentals, and systems, including—the functions of lighting equipment, light control and measurement.

AT 43 SPECIFICATIONS AND CONTRACT DOCUMENTS 3 Credits—48 Hours

Problems dealing with specifications and specification writing. Study of contemporary and the new Construction Specification Institute Specification format, bidding procedures, stipulation against leins, preparation of change orders, addendum and bulletins.

AT 44 SITE PLANNING 2 Credits—32 Hours

The study of site planning, including elevations, stadia, traverse work, lay out of plot plans from deeds, contours and contouring, grading, drainage, building and road stakeout, site selection.

AT 50 ADVANCED ARCHITECTURAL DESIGN

An advanced design study that enables the advanced student to continue beyond the level provided in the Residential and the Commercial, Industrial, and Religious Buildings design courses, for two to eight credits.

AT 50 ADVANCED ARCHITECTURAL DESIGN

An advanced design study that enables the advanced student to continue beyond the AT 50 level for an additional two to eight credits.

AU 11 HAND, MACHINE TOOLS, AND BENCH WORK 2 Credits—96 Hours

Learning to use common tools and special tools of the trade, bench and machine tools for tapping, threading, reaming, grinding, honing, lapping, and measuring.

AU 12 ENGINE SERVICE 3 Credits—144 Hours

Learning nomenclature, relation of parts, and assemblies, measuring, installing, fitting of pistons, piston pins and rings, bearings, etc. Oiling system. Aligning connecting rods. Valve service. Servicing components, timing settings.

AU 13 POWER TRAIN 2 Credits—96 Hours

Trouble shooting, installation and adjustment of clutches. Diagnosis and repair of standard units and overdrive; servicing of same. Theory, construction and operation of automatic units; adjustment of same and where advisable, the repair and rebuilding of automatics. Servicing of automatic transmissions. Service and repair of universal joints, rear wheel bearings and seals.

AU 18 ELECTRICAL SYSTEM 2 Credits—96 Hours

Service and repair of generators, regulators, motors, batteries and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

AU 22 ENGINE SERVICE 3 Credits—144 Hours

Learning nomenclature, relation of parts and assemblies, measuring, installing, fitting of pistons, piston pins and rings, bearings, etc. Oiling system. Aligning connecting rods. Valve service. Servicing components, timing settings.

AU 23 POWER TRAIN 1 Credit—48 Hours

Trouble shooting, installation and adjustment of clutches. Diagnosis and repair of standard units and overdrive; servicing of same. Theory, construction and operation of automatic units; adjustment of same, and where advisable,

the repair and rebuilding of automatics. Servicing of automatic transmissions. Service and repair of universal joints, rear wheel bearings and seals.

AU 25 DIFFERENTIALS 1 Credit—48 Hours

Service and repair of differential units, including interlocking types.

AU 26 BRAKES 2 Credits—96 Hours

Complete modern brake servicing—lining, bleeding, adjusting, etc. Repair of master and wheel cylinders and other hydraulic components. Power brake service.

AU 27 BODY AND CHASSIS 1 Credit—48 Hours

Body repairs such as rattles, squeaks, leaks, etc. Servicing of various power operated accessories such as windows, convertible tops, seats, heaters, defrosters, etc. Repair of exhaust system, shock absorber service and other service items pertinent to body and/or chassis.

AU 29 FUEL SYSTEMS 1 Credit—48 Hours

Cleaning and rebuilding carburetors; adjusting same. Use of modern test and service equipment. Test and repair of fuel pumps.

AU 32 ENGINE SERVICE 1 Credit—48 Hours

Learning nomenclature, relation of parts and assemblies, measuring, installing, fitting of pistons, piston pins and rings, bearings, etc. Oiling system. Aligning connecting rods. Valve service. Servicing components, timing settings.

AU 34 FRONT SUSPENSION 1 Credit—48 Hours

Complete servicing, repair, and adjustment of front suspension (and rear, where applicable) systems. Wheel balancing. Power steering services and repairs.

AU 37 BODY AND CHASSIS 1 Credit—48 Hours

Body repairs such as rattles, squeaks, leaks, etc. Servicing of various power operated accessories such as windows, convertible tops, seats, heaters, defrosters, etc. Repair of exhaust system, shock absorber service and other service items pertinent to body and/or chassis.

AU 39 FUEL SYSTEMS 1 Credit—48 Hours

Cleaning and rebuilding carburetors; adjusting same. Use of modern test and service equipment. Test and repair of fuel pumps.

AU 40 TUNE-UP 2 Credits—96 Hours

Use of modern scientific test equipment in setting up fuel and ignition for top performance. Same for generating system. Diagnosing engine condition by "reading" instruments, spark plugs, and other tell-tale signs.

AU 41 TROUBLE SHOOTING 2 Credits—96 Hours

Diagnosis of troubles in engine, chassis or other units by specific methods of deduction by elimination. Learning to do this rapidly and accurately.

AU 44 FRONT SUSPENSION 2 Credits—96 Hours

Complete servicing, repair, and adjustment of front suspension (and rear, where applicable) systems. Wheel balancing. Power steering services and repairs.

AU 48 ELECTRICAL SYSTEM 3 Credits—144 Hours

Service and repair of generators, regulators, motors, batteries and all other electrical components. Ignition system service—use of modern testing and

servicing equipment. Lighting and warning devices. Circuitry and print reading.

BA 12 ACCOUNTING 3 Credits—48 Hours

A study of the basic accounting principles to develop an understanding of the elements of accounting, including the accounting cycle, preparation of statements and reports and interpretation of them as they apply primarily to the proprietorship and partnership forms of business. Three hours of lecture with assigned laboratory problems to be included in this course.

BA 22 ACCOUNTING 3 Credits—48 Hours

The further development of the accounting principles as they apply to the different forms of business with emphasis on corporate accounting. Problems of accounting dealing with manufacturing, departmental and branch operations to be covered in this course. Three hours of lecture. Assigned laboratory problems and practice sets are required.

PREREQUISITE: BA 12 or permission of department

BA 32 ACCOUNTING 3 Credits—48 Hours

Deals with the study of intangible assets, liabilities, stockholders equities and emphasis on the analysis and interpretation of financial reports and other supplementary statements. Three hour lecture with assigned laboratory exercises and problems.

PREREQUISITE: BA 22

BA 42 COST ACCOUNTING 3 Credits—48 Hours

Cost accounting consists of keeping accurate records and inventories of a manufacturing enterprise. Transactions of a manufacturing business, determining costs, total costs after processing, and profit through distribution are discussed throughout this course.

PREREQUISITE: BA 22

BA 43 PAYROLL AND TAX ACCOUNTING 3 Credits—48 Hours

This course is designed to acquaint students with payroll procedures, and the different rules and regulations regarding Federal and State Income Taxes. Federal income taxes will be stressed from the individual and small business standpoints.

PREREQUISITE: BA 12

BC 10 SAFETY EDUCATION 20 Hours

Safety Education, as it applies to a bench carpenter, will naturally find a great deal of emphasis placed on the handling of edge tools, as well as guards, the correct body position, and proper eye protection. Posters, slogans, and movies by the Manufacturers Associaiton, will be on display or shown, as well as lectures by their representatives.

BC 11 HAND TOOLS 120 Hours

During a course of hand tools for a bench carpenter, great stress must be placed on accuracy and neatness. Therefore exercises that will develop the necessary skills will be stressed. Measuring, sawing, chiseling, paring, and hammering will be emphasized throughout.

BC 12 BLUEPRINT READING 90 Hours

Familiarization with orthographic projections and the ability to read and interpret drawings must be emphasized. Full size details must be carefully studied in order to understand the method of construction required.

BC 13 RELATED MATH 96 Hours

Mathematics that will assist the student to correctly read his rule or square and change from tenths to sixteenths, as well as twelfths, must be carefully reviewed. Fractions, decimals, percentages and discounts are an important part of this program.

BC 14 IDENTIFICATION OF LUMBER 30 Hours

Attempts will be made to teach a student to identify lumber by sight, recognizing the various grains and densities as well as any odors that are prevelant. Woods will be studied in regards to weight, nail-holding power and elasticity.

BC 15 BENCH WORK AND HAND OPERATION 286 Hours

It is within this part of the program we hope to develop the sense of craftsmanship and skill that is essential in order that a person can truly be called a craftsman and perform work acceptable to industry.

BC 16 HOLDING DEVICES AND FASTENING 25 Hours

The proper use and method of applying clamps of various kinds must be stressed, as well as holding members in their respective positions after clamps have been removed.

BC 17 HAND AND POWER SANDING 20 Hours

The correct procedure and method of using both hand and power sanding equipment must be stressed, in order that the finished product will appear professional.

BC 18 PORTABLE POWER TOOLS 118 Hours

The various power tools used by bench carpenters in the capacity of bench mechanic will be stressed. Straight line sanders, orbital sanders, electric drills, electric screw drivers, saber saws, circular saws, and routers will be used on live projects to develop the necessary skills of operation.

BC 19 PRODUCTION JIGS AND FIXTURES 60 Hours

The method and procedure required to produce a jig and fixture that will adequately stand up under production techniques must be undertaken and built by the student.

BC 20 ASSEMBLY, GLUING AND CLAMPING 280 Hours

Since assembly, gluing and clamping are a major part of a bench carpenter's duties, he must spend a great deal of time taking parts that have been previously machined by another person on a mill floor and making a finished product.

BC 21 STOCK BILLING 36 Hours

Stock billing will consist of taking standard shop drawings of a given project from a local manufacturing firm and listing the cutting orders needed to do a specific job.

BC 22 WOOD SHOP MACHINES 115 Hours

Instruction in the safe use and operation of such wood working machines as crosscut saws, planers, jointers and straight line ripsaw, as well as hand saws and shapers, will be stressed. During this course emphasis will be placed on proper installation of new blades and complete care of machines, as well as learning what varied operations can be performed safely on each machine.

BC 23 PRODUCTION TECHNIQUES 90 Hours

In order to best accomplish the production techniques as used by industry, visitation to plants performing corresponding work will be made. Shop jobs will be routed, as in industry, and standards set up and stressed so that finished product could well meet industrial specifications.

BM 13 PRINCIPLES OF BUSINESS 3 Credits—48 Hours

This course provides the student with a basic understanding of business procedures and the various roles of business in our American Economic Systems.

BM 14 OFFICE MACHINES 2 Credits—80 Hours

Gives students a basic understanding of the various types of machines that are used in the business office. The operation of such machines as the ten-key, full-keyboard-adding-listing, rotary, and key-driven calculators are covered throughout this course.

BM 21 BUSINESS ENGLISH 3 Credits—48 Hours

The student is trained to organize, outline, and prepare reports, and to write the basic types of business letters. Emphasis is placed on accuracy, clarity, and effectiveness in both written and oral presentations of business materials.

PREREQUISITE: TE 11

BM 23 BUSINESS MATHEMATICS 3 Credits—48 Hours

This course includes the study of mathematics as it applies to installment buying, discounting notes and drafts, insurance contracts, property and income taxes, social security, stocks and bonds, and transportation. The preparation of graphs and the use of measurements and business records are also included.

PREREQUISITE: General Math Elective

BM 24 OFFICE MACHINES 2 Credits—80 Hours

A more extensive study of the basic office machines. Students also get experience on the duplication machines and transcribing equipment. This course can be submitted for office practices.

PREREQUISITE: BM 14

BM 31 BUSINESS LAW 3 Credits—48 Hours

This course traces briefly the evolution of law. Major emphasis is placed on the study of law as it pertains to individual and business contracts. The laws of negotiable instruments, personal property sales, and bailment contracts are included.

BM 33 BUSINESS ORGANIZATION AND MANAGEMENT 3 Credits—48 Hours

This course is designed to help the student understand the structure of sole proprietorships, partnerships, corporations, and the methods of establishing and financing them. The study of management and basic information on the elements of an organization, principles of authority, accountability, and responsibility. The levels theory, communication, policy formulation, incentive, and efficiency are covered in this course.

BM 34 OFFICE MACHINES 2 Credits—48 Hours

A detailed study of the more advanced office machines. Training on the Accounting machines; namely, accounts receivable, payroll, and the inventory control will be offered in this course.

PREREQUISITE: BM 14 or permission of department

BM 35 PSYCHOLOGY 3 Credits—48 Hours

This course is aimed toward orienting the student to the personal adjustments he will likely have to make to be successful and happy in his work. It will also deal with the behavior and human problems as they exist in modern business. These problems will be discussed from both the employee and the employer's point of view.

BM 36 MARKETING 3 Credits—48 Hours

This course illustrates various methods of merchandising and the channels of distribution from producer or manufacturer to the ultimate consumer. Government regulations, pricing, cost and branding, influence of the buyers and consumers on marketing programs and current marketing trends are presented.

BM 41 BUSINESS LAW 3 Credits—48 Hours

The laws of contracts for insurance, surety and guaranty agreements, partnerships, corporations, real property, wills, and bankruptcy proceedings are the topics included in this course. Court systems and procedures in lawsuits are studied.

PREREQUISITE: BM 31

BM 45 FINANCE 3 Credits—48 Hours

This course is designed to give the student an understanding of the whole field of finance, both private and public. Monetary and credit systems of the United States capital markets, factors affecting the supply of funds, and monetary and credit policies and problems will be the chief coverage of this course.

BM 46 SOCIAL STUDIES 3 Credits—48 Hours

This is a basic course in macroeconomics designed to give the student a basic understanding of our economic system, including money credit, banking production, income, employment, business fluctuations, and economic analysis and policies.

BS 10 TYPEWRITING 2 Credits—80 Hours

Develops a firm foundation in the skill of typewriting. Familiarization of the typewriter, fundamentals of touch typing, mechanical parts, speed, accuracy, business letters and forms will be included. (Students who have had typing, and can pass the required standards, may elect another subject).

BS 11 BUSINESS BEHAVIOR 2 Credits—32 Hours

Business behavior is designed to develop the polish essentials to success in today's modern business office. The student will evaluate himself in relation to his responsibilities to his fellow employees and supervisors. A study of good working habits, and attitudes is undertaken. An opportunity for evaluation and development of his own personality is afforded.

BS 14 SHORTHAND 3 Credits—80 Hours

A beginning course in Gregg shorthand, Diamond Jubilee system. Basic principles and theory. Emphasis on outlines and proper techniques, aimed toward attainment of fluency in reading and writing shorthand. Some dictation is given at slow speeds.

BS 20 TYPEWRITING 2 Credits—80 Hours

This course is designed to further the students ability in typewriting. A large portion of the course is devoted to production typing, special skill techniques, advanced letter writing, advanced tabulation reports, typing of legal forms and documents, and routine clerical-type duties.

PREREQUISITE: BS 10 or must pass test to qualify

BS 23 OFFICE PRACTICE 2 Credits—48 Hours

Practice in the operation of the various kinds of office machines: Ditto, mimeograph, dictating, and transcribing machines. Office activities relating to filing, use of the telephone, working with office forms, supplies and handling of mail will be included in this course.

BS 24 SHORTHAND 3 Credits—80 Hours

Continuation and re-emphasis of shorthand theory. Work on development of dictation skills; pre-transcription training. Concurrent emphasis on business vocabulary, spelling, essential principles of punctuation.

BS 30 TYPEWRITING 2 Credits—80 Hours

To develop creative skills, report and manuscript production, statistical reports and other advanced techniques of production typing.

PREREQUISITE: BS 20

BS 34 SHORTHAND WORKSHOP 6 Credits—96 Hours

Development of dictation and transcription of the business letter to a speed and accuracy adequate for the modern office. Dictation from various fields of business and industry. Intensive drill on essential business forms and necessary basic office skills leading to secretarial responsibilities.

BS 44 SECRETARIAL WORKSHOP 9 Credits—144 Hours

A comprehensive course correlating and integrating all phases of advanced dictation and transcription skills. Here an opportunity is given for specialization in secretarial duties—medical, legal, technical, or executive. From a definite textbook and correlated materials the secretary is given wide training in technical skills of wide utility. Training is also given in special secretarial duties such as using reference sources, typing manuscripts and minutes, speeches and reports. Emphasis is placed on broadened duties related to executive office functions. Practical work experience is included.

CA 10 HAND TOOLS 144 Hours

The work here is of laboratory nature and stresses the care and use of hand tools as well as the skills that must be developed. Measuring, grinding, testing, and sawing is emphasized at this phase, emphasis being placed on accuracy.

CA 11 THEORY OF CARPENTRY CONSTRUCTION 48 Hours

This being a class room subject, model slides, pictures, mock-ups, etc., are used to correlate the theory and practical aspects of Carpentry Construction.

CA 12 PORTABLE TOOLS—WOOD SHOP MACHINES 144 Hours

Portable power tools used in the Construction Industry as well as the normal Wood Shop Machines are studied from both the view point of actual operation, their safe usage, and what you can expect from a performance standpoint, as well as jobs that may be done safely.

CA 16 SAFETY EDUCATION 48 Hours

Safety Education in carpentry will include the proper handling of edge tools, portable power tool guards, clamping of stock for drilling, the use of safety helmets, safety goggles, eye shields, safety regulations as they apply to scaffold building and safe loads for ropes, etc.

CA 20 ADVANCED HAND AND MACHINE OPERATIONS 144 Hours

Advanced projects that can be accomplished by hand and machines are emphasized while pursuing this course. Such items as small shaper jobs which

may be moldings of various sizes and shapes. Unusual jobs that can be performed safely on the radial saw, or jobs that should be done on portable power tools. One thirty-second inch accuracy is stressed on all jobs as this point, as well as neatness and safety.

CA 21 THEORY OF FRAMING AND SHEATHING 48 Hours

The theory relative to the proper methods of construction where framing is an integral part of the structure is carefully studied, as well as various types of sheathing used in the building industry today.

CA 22 SHOP AND TECHNICAL MATHEMATICS 48 Hours

The mathematics studied in this course is a combination of all math a student has pursued up to this point, and applying it in a practical manner in order to solve problems of roof framing, stair building, estimating, surveying, etc.

CA 23 BLOCK CONSTRUCTION 240 Hours

During the masonry block construction course a great deal of emphasis will be placed on exercises in laying building block of various styles and design to gain varied effects. These patterns make blockwork more appealing and lends an artistic effect that enhances the value.

CA 24 THEORY OF CONCRETE CONSTRUCTION 48 Hours

This course deals with the principles of concrete design, water cement ratio, proportions of ingredients and reinforced concrete. A careful study is made for concrete footers and walls as well as finishing both hand and power troweling equipment, aslo proper methods of curing and testing are studied.

CA 30 BLUEPRINT READING 48 Hours

The ability to read and interpret floor plans, elevations, sections and details, as prepared by the Architect are carefully studied, as well as shop sketching.

CA 31 SURVEYING AND STAKE OUT 96 Hours

The basic fundamental principles of surveying are taught, included are such items as stake out for a building, laying out for excavation and building lines, using the level and transit.

CA 32 HOUSE FRAMING 144 Hours

During the house framing course such items as are studied relative to actually building a home or similar project, emphasis is placed on framing and erecting of columns, girders, floors, sidewalls, partitions, and roof framing as required in home construction. Aligning and bracing the building simple stairs. Also the application of wood and insulation sheathing.

CA 33 BRICK CONSTRUCTION 192 Hours

Masonry of which brick construction is a vital part stresses exercises in laying various patterns of brick in order to meet the standards of industry both in speed and accuracy and also follow the Architect's drawings. Included will be such projects as chimneys, fireplaces, walls, etc., encountered in light construction industry.

CA 34 METHODS OF BRICK AND BLOCK CONSTRUCTION 48 Hours

This being a theoretical course, emphasis will be placed on the why and how of the various methods used in the building industry. Style, design, strength and construction will be studied.

CA 40 THEORY ON STEEL SQUARE 48 Hours

The object of this course is to shed a light upon the general belief that certain markings on the steel square are mysterious. It is hoped that a course on the steel square will make it a more meaningful and useful tool. Emphasis will be placed on its application to roof framing, stair building as well as laying out such projects as hoppers, squares, octagons, hexagons and various angles.

CA 41 HOUSE CONSTRUCTION 240 Hours

Training in this course will consist of actual on the job training such as building a house or similar project. This means taking blueprints that have previously beeen approved and bring the project to its logical conclusion.

CA 43 INTERIOR FINISH AND CABINET WORK 96 Hours

It is hoped that this course will climax the individual's training, because of the degree of accuracy and neatness that is demanded by the home builders of today.

CA 44 BUILDING MAINTENANCE 96 Hours

The course in Building Maintenance is intended to give the individual a more comprehensive picture of the building industry as well as being able to use his ingenuity and imagination. During this program you actually meet up with situations that cannot be foreseen, or may not be shown on your drawings for one reason or another.

CB 10 HAND TOOLS 3 Credits—144 Hours

The work here is of laboratory nature and stresses the care and use of hand tools as well as the skills that must be developed. Measuring, grinding, testing, and sawing is emphasized at this phase, emphasis being placed on accuracy.

CB 12 PORTABLE TOOLS—WOOD SHOP MACHINES 3 Credits—144 Hours

Portable power tools used in the Construction Industry, as well as the normal Wood Shop Machines, are studied from both the view point of actual operation, their safe usage, and what you can expect from a performance standpoint, as well as jobs that may be done safely.

CB 16 SAFETY EDUCATION 1 Credit—16 Hours

Safety Education in carpentry will include the proper handling of edge tools, portable power tool guards, clamping of stock for drilling, the use of safety helmets, safety goggles, eye shields, safety regulators as they apply to scaffold building and safe loads for ropes and etc.

CB 23 BLOCK CONSTRUCTION 4 Credits—192 Hours

During the masonry block construction course a great deal of emphasis will be placed on exercises in laying building block of various styles and design to gain varied effects. These patterns make block work more appealing and lends an artistic effect that enhances the value.

CB 32 HOUSE FRAMING 2 Credits—96 Hours

During the house framing course such items as are studied relative to actually building a home or similar project, emphasis is placed on framing as required in home construction. Aligning and bracing, the building of simple stairs. Also the application of wood and insulation sheathing.

CB 33 BRICK CONSTRUCTION 5 Credits—240 Hours

Masonry of which brick construction is a vital part stresses exercises in laying various patterns of brick in order to meet the standards of industry both in

speed and accuracy and also follow the Architects drawings. Included will be such projects as chimneys, fireplaces, walls, etc., encountered in light construction industry.

CB 41 HOUSE CONSTRUCTION 5 Credits—96 Hours

Training in this course will consist of actual on the job training such as building a house or similar projects. This means taking blueprints that have previously been approved and bring the project to its logical conclusion.

CB 43 INTERIOR FINISH AND CABINET WORK 2 Credits—96 Hours

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CB 44 BUILDING MAINTENANCE 2 Credits—96 Hours

The course in building maintenance is intended to give the individual a more comprehensive picture of the building industry as well as being able to use his ingenuity and imagination. During this program you actually meet up with situations that cannot be foreseen, or may not be shown on your drawings for one reason or another.

CS 01 INTRODUCTION TO DATA PROCESSING 3 Credits—48 Hours

For non-computer science majors only. General introduction to data processing and concepts of unit record system. Practice and theory in operation and wiring, illustrating the need for machines in accounting and record keeping; and the concepts, power and flexibility of the unit record.

CS 02 INTRODUCTION TO COMPUTER PROGRAMMING 2 Credits—48 Hours

For non-computer science majors only. Algebraic programming for technical students. Includes essentials and basic concepts of computer system components, computer logic, block diagramming, programming and problem solving.
PREREQUISITE: TM 11

CS 10 BASIC COMPUTING MACHINES 3 Credits—96 Hours

Theory and practice on unit record systems including wiring, operation, and machine functions of card punch, verifier, interpreter, sorter, reproducer, collator and accounting machine.

CS 11 COMPUTER PROGRAMMING 4 Credits—128 Hours

Introduction to computing systems and components, programming logic, flow charting and machine language. Introduction to symbolic-programming languages with applied problems. Includes program writing, testing, subroutines, programming techniques and use of sequential and random access storage.

CS 12 ALGEBRAIC COMPUTER PROGRAMMING 3 Credits—96 Hours

Algebraic language programming as applied to engineering, mathematic and business problems. Utilization of disk storage, monitor and plotter systems.
PREREQUISITE: TM 13

CS 20 ADVANCED PROGRAMMING 3 Credits—96 Hours

Continuation of CS 11. Familiarization of the structure, functions and manipulation of the various types of programming systems and languages. Includes assembly programs, compilers, macro-generators, report generators, etc.

CS 22 PROGRAMMING SYSTEMS AND SCHEDULERS 3 Credits—80 Hours

The logic and concepts of programs for computer system control. The Monitor,

The Executive System, utility programs, data scheduling systems and high level languages. Practicum in system programming and maintenance.

PREREQUISITE: CS 11 or CS 12

CS 23 SYSTEMS DEVELOPMENT I — 3 Credits—80 Hours

Concepts of the organization of complete computer systems. The course is designed to guide the student through the stages in the evolution of a system; analysis, system specifications, equipment selection, flow charting, programming, testing, and documentation of an applied problem.

PREREQUISITES: CS 10 and CS 11 or CS 12

CS 24 SYSTEMS DEVELOPMENT II — 3 Credits—112 Hours

Continuation of CS 23. The solution of an advanced problem in system development from concept to documentation. If practicable, this problem will be carried out in an available industrial computational facility as a field and research problem.

CS 26 ENGINEERING PROGRAMMING — 3 Credits—96 Hours

Training in the application of computers in such technical areas as numerical control, civil engineering, etc., with solution of applied problems. Characteristic of languages such as COGO, AUTOSPOT.

PREREQUISITES: CS 12, MD 01, and TM 13

CS 27 NUMERICAL METHODS AND PROGRAMMING — 3 Credits—96 Hours

Course is designed to give a basic understanding of the more sophisticated methods of numerical solution of advanced problems in engineering and mathematics. Fundamental principles of engineering analysis, computational methods, statistics and linear programming with problem solving.

PREREQUISITES: CS 12, TM 13, and TM 33

CS 28 COMPUTER LOGIC — 3 Credits—48 Hours

Familiarization with the general organization of computers and their basic circuit components. Includes analysis of the circuitry for computer arithmetic, logic and control process of the various computer units. Introduction and application of Boolean algebra.

PREREQUISITE: TS 21 or TS 32

CT 10 SURVEYING — 5 Credits—192 Hours

Introduction to Plane Surveying; use and care of instruments; distance measurement (horizontal and vertical); compass surveys; transit and tape surveys; property surveys; topographic surveys; computations and plotting.

PREREQUISITES: High School Trigonometry, Geometry and Algebra

CT 20 SURVEYING (ADVANCED) — 5 Credits—192 Hours

Precise distance measurement (horizontal and vertical); topographic surveys; property and boundary surveys; precise leveling; trigonometric leveling; precise traverse; triangulation of small areas; highway curves (simple, compound and spiral); surveys by State Coordinates; computations and plotting.

PREREQUISITE: CT 10

CT 21 CARTOGRAPHY — 5 Credits—144 Hours

Use and construction of maps; map projections; history of maps; drafting techniques (inking, scribing and plotting); map styling; reproduction and processing.

PREREQUISITE: MD 10

CT 30 SURVEYING 5 Credits—192 Hours

General Highway Surveying; field astronomy; principles of hydrographic surveying; photogrammetric surveys; precise triangulation; legal aspects of surveying; computations and plotting.

PREREQUISITE: CT 20

CT 31 ENGINEERING TECHNOLOGY 3 Credits—80 Hours

Economics of highway location; design of curves and grades; widening and superrelevation; earthwork, drainage and culverts; roads and pavements; construction and maintenance costs of highways; subgrade structure; theory of highway design.

PREREQUISITE: CT 20

CT 32 PHOTOGRAMMETRY 3 Credits—80 Hours

Aerial photography (procurement, application and economics); geometry of photographs; measurement with photograph; topographic mapping from photographs; plotting and computations.

PREREQUISITES: CT 20 and CT 21

CT 40 SURVEYING 5 Credits—192 Hours

Route surveying; city surveying; geodetic surveying.

PREREQUISITE: CT 30

CT 41 ENGINEERING TECHNOLOGY 3 Credits—80 Hours

Highway design; sub-division design; traffic analysis and surveys.

PREREQUISITE: CT 31

CT 42 PHOTOGRAMMETRY 3 Credits—80 Hours

Photo-interpretation; photo-mapping; topographic mapping; aerial triangulation; contracts and specifications.

PREREQUISITE: CT 32

DC 10 BASIC DRAFTING I 228 Hours

A study of basic drafting for those who major in Mechanical Engineering Drafting Technology and Mechanical Drafting. Course includes the use of drawing instruments, lettering, geometric construction, orthographic projection, isometric drawings, sectioning, dimensioning, auxiliary views, revolutions, and free-hand sketching. (To be scheduled with DC 11.)

DC 12 BASIC DRAFTING II 228 Hours

A study of drafting for those who major in Mechanical Engineering Drafting Technology. Course includes screwthreads and fastening devices, working drawings, assembly drawings, installation drawings, sheet metal intersections and developments. (To be scheduled with DC 10.)

DC 20 APPLIED DRAFTING TECHNIQUES II 252 Hours

A study of drafting for those who major in Mechanical Engineering Drafting Technology and Mechanical Drafting. Course includes the making of fairly complicated detail drawings to conform to industrial and military standards, including tolerance dimensioning. (To be scheduled with DC 22.)

PREREQUISITES: DC 10 and DC 12

DC 22 APPLIED DRAFTING TECHNIQUES II 252 Hours

A study of drafting for those who major in Mechanical Engineering Drafting Technology. Course includes the making of more complicated detail drawings. Here the student is required to apply his knowledge of drafting in making

drawings from industrial castings and redesigning castings into weldments. (To be scheduled with DC 20.)

DC 30 MECHANISMS I 236 Hours

A study of drafting for those who major in Mechanical Engineering Drafting Technology. Course includes a study of the motion in machines such as cams and linkages. (To be scheduled with MD 30.)

PREREQUISITES: DC 10 and DC 12

DC 32 MECHANISMS II 236 Hours

A study in drafting for those who major in Mechanical Drafting. Course includes a study of the motion in machines such as cams and linkages. (To be scheduled with DC 30.)

DC 40 ADVANCED DETAILING 236 Hours

A study in drafting for those who major in Mechanical Engineering Drafting Technology and Mechanical Drafting. Course includes an advanced study and application of drafting using layouts from industry to make detail and subassembly drawings. Also included are geometric tolerancing, true position dimensioning and surface finishing according to military standards. (To be scheduled with DC 42.)

PREREQUISITES: DC 10, DC 12, DC 20, and DC 22

DC 42 ADVANCED DETAIL & LAYOUT 236 Hours

A study in drafting for those who major in Mechanical Drafting. Course includes the most advanced study of drafting and the making of layout drawings. (To be scheduled with DC 40.)

DM 11 HAND, MACHINE TOOLS, AND BENCH WORK 96 Hours

Learning to use common tools and special tools of the trade, bench and machine tools for tapping, threading, reaming, grinding, honing, lapping, and measuring.

DM 12 ENGINE PRINCIPLES 96 Hours

Fundamental knowledge of the construction, nomenclature, relationship of parts and principles of engines. Disassembly, inspection, reassembly, and operation of engines. Oiling system. Piston and connecting rod repairs. Valve service. Timing of valves and ignition.

DM 15 POWER TRAIN 40 Hours

Trouble shooting, installation and adjustment of clutches. Diagnosis and repair of standard units and overdrive; servicing of same. Theory, construction and operation of automatic units; adjustment of same, and where advisable, the repair and rebuilding of automatics. Servicing of automatic transmissions. Service and repair of universal joints, rear wheel bearings and seals.

DM 16 ENGINE MAINTENANCE 144 Hours

Proper procedure in maintenance, inspection of parts, repairs and tests, analysis of malfunctions, and efficiency of making repairs. Engine and all components (such as superchargers, blowers, pumps, governors, and heat exchangers) are covered. Starting and stopping procedures.

DM 18 ELECTRICAL SYSTEM 144 Hours

Service and repair of generators, regulators, motors, batteries and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

DM 22 ENGINE PRINCIPLES 48 Hours

Fundamental knowledge of the construction, nomenclature, relationship of parts and principles of engines. Disassembly, inspection, reassembly, and operation of engines. Oiling system. Piston and connecting rod repairs. Valve service. Timing of valves and ignition.

DM 23 COMBUSTION FUELS AND INJECTION SYSTEMS 96 Hours

Diesel injection, ignition, and fuel types. Pump, nozzle, injector and governor construction, service, and repair. Adjustment of fuel system components.

DM 25 POWER TRAIN 96 Hours

Trouble shooting, installation and adjustment of clutches. Diagnosis and repair of standard units and overdrive; servicing of same. Theory, construction and operation of automatic units; adjustments of same, and where advisable, the repair and rebuilding of automatics. Servicing of automatic transmissions. Service and repair of universal joints, rear wheel bearings and seals.

DM 26 ENGINE MAINTENANCE 136 Hours

Proper procedure in maintenance, inspection of parts, repairs and tests, analysis of malfunctions, and efficiency of making repairs. Engine and all components (such as superchargers, blowers, pumps, governors, and heat exchangers) are covered. Starting and stopping procedures.

DM 28 ELECTRICAL SYSTEM 144 Hours

Service and repair of generators, regulators, motors, batteries and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

DM 33 COMBUSTION FUELS AND INJECTION SYSTEMS 144 Hours

Diesel injection, ignition, and fuel types. Pump, nozzle, injector and governor construction, service, and repair. Adjustment of fuel system components.

DM 36 ENGINE MAINTENANCE 184 Hours

Proper procedure in maintenance, inspection of parts, repairs and tests, analysis of malfunctions, and efficiency of making repairs. Engine and all components (such as superchargers, blowers, pumps, governors, and heat exchangers) are covered. Starting and stopping procedures.

DM 44 VEHICLE MAINTENANCE 96 Hours

Service and repair of motor vehicles, cars and trucks, as an introduction to type and work expected in the trade; methods check for state inspection.

DM 46 ENGINE MAINTENANCE 96 Hours

Proper procedure in maintenance, inspection of parts, repairs and tests, analysis of malfunctions, and efficiency of making repairs. Engine and all components (such as superchargers, blowers, pumps, governors, and heat exchangers) are covered. Starting and stopping procedures.

DM 47 PUMPS AND ACCESSORIES 280 Hours

Construction of and repair of centrifugal, positive displacement and various other types of pumps. Engine control accessories, governors, pressure and temperature cut-outs, pyrometers, thermometers, tachometers, gauges (calibration of same), manometers, etc. Servicing air compressors, purifiers and blowers.

DT 11 HAND, MACHINE TOOLS, AND BENCH WORK 2 Credits—96 Hours

Learning to use common tools and special tools of the trade, bench and machine tools for tapping, threading, reaming, grinding, honing, lapping, and measuring.

DT 12 ENGINE PRINCIPLES 2 Credits—96 Hours

Fundamental knowledge of the construction, nomenclature, relationship of parts and principles of engines. Disassembly, inspection, reassembly, and operation of engines. Oiling system. Piston and connecting rod repairs. Valve service. Timing of valves and ignition.

DT 15 POWER TRAIN 1 Credit—48 Hours

Trouble shooting, installation and adjustment of clutches. Diagnosis and repair of standard units and overdrive; servicing of same. Theory, construction and operation of automatic units; adjustment of same, and where advisable, the repair and rebuilding of automatics. Servicing of automatic transmissions. Service and repair of universal joints, rear wheel bearings and seals.

DT 16 ENGINE MAINTENANCE 2 Credits—96 Hours

Proper procedure in maintenance, inspection of parts, repairs and tests, analysis of malfunctions, and efficiency of making repairs. Engine and all components (such as superchargers, blowers, pumps, governors, and heat exchangers) are covered. Starting and stopping procedures.

DT 18 ELECTRICAL SYSTEM 2 Credits—96 Hours

Service and repair of generators, regulators, motors, batteries, and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

DT 22 ENGINE PRINCIPLES 1 Credit—48 Hours

Fundamental knowledge of the construction, nomenclature, relationship of parts and principles of engines. Disassembly, inspection, reassembly, and operation of engines. Oiling system. Piston and connecting rod repairs. Valve service. Timing of valves and ignition.

DT 23 COMBUSTION FUELS AND INJECTION SYSTEMS 2 Credits—96 Hours

Diesel injection, ignition, and fuel types. Pump, nozzle, injector, and governor construction, service, and repair. Adjustment of fuel system components.

DT 25 POWER TRAIN 1 Credit—48 Hours

Trouble shooting, installation and adjustment of clutches. Diagnosis and repair of standard units and overdrive; servicing of same. Theory, construction and operation of automatic units; adjustment of same, and where advisable, the repair and rebuilding of automatics. Servicing of automatic transmissions. Service and repair of universal joints, rear wheel bearings and seals.

DT 26 ENGINE MAINTENANCE 3 Credits—144 Hours

Proper procedure in maintenance, inspection of parts, repairs and tests, analysis of malfunctions, and efficiency of making repairs. Engine and all components (such as superchargers, blowers, pumps, governors, and heat exchangers) are covered. Starting and stopping procedures.

DT 28 ELECTRICAL SYSTEM 2 Credits—96 Hours

Service and repair of generators, regulators, motors, batteries, and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

DT 33 COMBUSTION FUELS AND INJECTION SYSTEMS 3 Credits—144 Hours

Diesel injection, ignition, and fuel types. Pump, nozzle, injector, and governor construction, service, and repair. Adjustment of fuel system components.

DT 46 ENGINE MAINTENANCE 2 Credits—96 Hours

Proper procedure in maintenance, inspection of parts, repairs and tests, analysis of malfunctions, and efficiency of making repairs. Engine and all components (such as superchargers, blowers, pumps, governors, and heat exchangers) are covered. Starting and stopping procedures.

DT 47 PUMPS AND ACCESSORIES 6 Credits—288 Hours

Construction of and repair of centrifugal, positive displacement on various other types of pumps. Engine control accessories, governors, pressure and temperature cut-outs, pyrometers, thermometers, tachometers, gauges (calibration of same), manometers, etc. Servicing air compressors, purifiers, and blowers.

DT 49 TESTING AND POWER MEASUREMENT 1 Credit—48 Hours

Analysis of engine operation, horsepower measurement, cylinder pressure, temperature limitations, proper operational procedure. Trouble shooting engine operations. Dynamometer tests and operation.

ED 11 RELATED ELECTRONIC AND ELECTRIC DRAWING 3 Credits—144 Hours

This course is a beginning course in Electronics Drafting Technology and Electronics Drafting. This course may also be taken as an elective by students majoring in Electricity, Electrical Construction, Electronics, and Radio and Television Communication. The course includes the basic principles of orthographic projection, geometric construction, sketching, electrical, electronic and radio symbols, schematic drawings and blueprint interpretation, lettering, and dimensioning.

ED 20 BASIC DRAFTING—ELECTRONIC OPTION 3 Credits—144 Hours

A study of basic drafting for those who major in Electronic Drafting Technology. The course includes the use of drawing instruments, orthographic projection, dimensioning, sections, auxiliary views, revolutions, fasteners, working drawings, assembly drawings, pictorial drawing, sheet metal developments and intersections. Problems will be slanted toward electronic-type projects.

PREREQUISITE: ED 11

ED 30 ELECTRONIC DRAFTING—BASIC 3 Credits—144 Hours

Drafting and related experiences in Electronics Drafting are given in the following areas: Electronic Drafting techniques, schematics, wiring diagrams, pictorials, block diagrams, circuit tracing, typical mechancial and electronic components, technical publications, electronic readings, job procurement, inking, technical films, drafting theory, linen and mylar drafting techniques, industrial practices and standards.

PREREQUISITE: ED 10 or DE 10

ED 40 ELECTRONIC DRAFTING—ADVANCED 4 Credits—192 Hours

Drafting and related experiences in Electronics Drafting are continued in the following areas: Schematics, printed circuits, wiring diagrams, circuit tracing, MIL standards, technical publication, electronic readings, job procurement, inking, technical films, drafting theory, microcircuits, integrated circuitry, packaging, design for computor and Flexowriter programming, electrical instrumentation, industrial standards.

PREREQUISITE: ED 30

EI 31 BASIC INSTRUMENTATION 2 Credits—32 Hours

This is a lecture-demonstration course in Principles of Electro-mechanical instruments. It presents basic information on primary sensing elements, indicators, recorders, controllers, final control elements, and mechanisms. Variables, such as temperature, pressure, liquid level, and flow rate are discussed. Practical problems involving instrumentation fundamentals are assigned to each student.

EI 32 INDUSTRIAL ELECTRONICS 3 Credits—48 Hours

A study of Electron Tube and Semiconductor principles, characteristics and problems, Lecture-demonstration sessions include gaseous rectifiers, silicon controlled rectifiers, phototubes, saturable reactors, electronic power supplies, amplifiers, oscillators, detectors, motor control circuits, and servo-mechanisms, as used with electron tubes and semiconductor devices.

EI 33 BASIC ELECTRONIC LABORATORY 2 Credits—96 Hours

An introduction to shop techniques, starting with the proper use of hand tools, wiring, soldering and cable lacing. Basic electronic circuits are constructed, and then tested, using test equipment such as multimeters, vacuum tube voltmeters, oscilloscopes and signal generators. The student is required to document the test data in his laboratory notebook.

EI 34 MOTOR CONTROL AND SERVOMECHANISM LAB 2 Credits—96 Hours

Laboratory assignments involving wiring of starting and control equipment for DC and AC motors including start-stop, forward-reverse, and jogging push-button stations, speed controls, plugging and dynamic braking circuits. Hook-up of various types of servo motors to show their application in industry.

EI 35 BASIC INSTRUMENTATION LABORATORY 1 Credit—48 Hours

An introduction to instrument shop practices and techniques. Assignments include practical experiments in the proper use, adjustment, and repair of millivolt potentiometers, rotameters, proportional controllers, and hydrostatic level controllers.

EI 41 ELECTRONIC INSTRUMENTATION 3 Credits—48 Hours

This is an advanced course in measuring principles, transmission and telemetering, control systems, analytical instruments, potentiometer measurements and principles of closed-loop servo systems. Problems involving dynamic limitations of electronic systems such as control lag, overshoot, stability and conversion of measured variables are discussed and given as theory assignments.

EI 42 ELECTRONIC INSTRUMENTATION LAB 3 Credits—144 Hours

This phase of the program deals with the application of control systems design in the laboratory. The student is given the opportunity to design, build and test separate control devices, ultimately setting up complete systems and logging data obtained from the operation of these systems. The student is taught repair and maintenance procedures, applying trouble shooting techniques such as symptomatic diagnosis, signal substitution and signal tracing, localization and isolation of defective components.

EI 45 CALIBRATION AND STANDARDIZATION 1 Credit—48 Hours

This is a lecture-demonstration and practice course involving the principles of primary standards, secondary standards and shop standards. Using a laboratory type standards console, the student is required to calibrate a representative type of each measuring instrument. The student is made aware of the need for periodic calibration of all measuring and control instruments.

EL 11 DIRECT CURRENT FUNDAMENTALS 3 Credits—48 Hours

A study of basic electrical laws, electrical terms, wire calculations, magnetism and electro-magnetism, resistivity and conductance, batteries and other sources of electricity, static electricity and behavior of charges. Basic principles and operation of electrical meters and instruments. Study of the mechanical generation of electricty. Principles and operation of shunt, series and compound DC generators and motors.

EL 12 BASIC WIRING LABORATORY 2 Credits—96 Hours

A beginning laboratory course to acquaint the student with the tools and materials of the trade, the proper use and care of hand tools, soldering and splicing of wires and instruction in the hook-up of basic circuits. The student will receive instruction in the wiring of bell and annunciator circuits, residential lighting and receptacle circuits and low voltage switching and control circuits for the home and the hook-up of various kinds of fluorescent lights.

EL 13 DIRECT CURRENT LAB 2 Credits—96 Hours

Demonstrations showing proof of basic electrical formulas. Experiments for student participation to show parallel and series circuits, voltage drop in conductors, change of resistance with temperature, power and energy, magnetism, batteries and capacitors. Hook-up of DC generators and motors and paralleling of DC generators. Actual practice in the use of electrical instruments.

EL 21 ALTERNATING CURRENT FUNDAMENTALS 3 Credits—48 Hours

A study of the nature of alternating electricity as generated by machines. A study of impedance, inductive and capacitive reactance, power factor applications, converters, rectifiers and transformers. Current and voltage relationships in single and polyphase systems, vector representation and calculations. Principles and operation of AC instruments. Generation and distribution of alternating current, operation, phasing and synchronization of AC generators. Principles and operation of AC motors such as the shaded pole motor, split phase, repulsion-induction, squirrel cage and wound rotor motors.

EL 22 ALTERNATING CURRENT LABORATORY 2 Credits—96 Hours

Laboratory experiments to show the effect of inductance, capacitance, impedance, leading and lagging power factor and power factor correction. Connection and operation of transformers in single and three phase circuits. Connection and operation of AC rotating equipment, motors and alternators and the paralleling of alternators.

EL 31 BASIC ELECTRICAL CONSTRUCTION LAB 2 Credits—96 Hours

This lab will give the student actual experience in the use and installation of many kinds of electrical materials used in the trade. He will learn to install house wiring circuits in an actual home built by the building trade students. He will learn to properly install wiring boxes of many kinds and how to use and run armored cable, wiremold and romex. He will install fluorescent and incandescent lights, switches and receptacle circuits under actual conditions.

EL 34 MOTOR CONTROL AND SERVOMECHANISM LAB
2 Credits—96 Hours

Laboratory assignments involving wiring of starting and control equipment for DC and AC motors including Start-Stop, Forward-Reverse and Jogging push button stations, speed controls, plugging and dynamic braking circuits. Hook-up of various types of servo motors to show their application in industry.

EL 35 RESIDENTIAL WIRING AND CODE 2 Credits—32 Hours

A study of residential wiring circuits including low voltage remote control switching and electric heating. A thorough study of the National Electrical Code relative to the use of the code book and its provisions dealing with residential and other types of wiring.

EL 36 ELECTRICAL REPAIR AND MAINTENANCE 2 Credits—96 Hours

This is a laboratory course designed to give the student practical experience in the repair and maintenance of many kinds of electrical equipment. It includes methods for cleaning and lubrication of motors, drying out and testing of motors that have been in flood conditions, replacement of bearings and centrifugal starting devices. Analysis of circuit or connection faults, repair or replacement of defective switches, relays, signal lights or other control devices. Trouble-shooting on inoperative equipment such as motors, starters, lighting fixtures and appliances of various kinds.

EL 41 COMMERCIAL AND INDUSTRIAL WIRING 3 Credits—48 Hours

A study of text books dealing with electrical construction relating to industrial and commercial electrical wiring. This course will also show the relationship of the electrical code and its provisions relating to commercial and industrial electrical construction.

EL 43 ADVANCED MAINTENANCE AND REPAIR LAB 3 Credits—144 Hours

This will be a continuation of the basic lab to increase the student's skill in using tools and diagnosing of troubles. The student will learn to wind small transformers and coils. Motor rewinding will be optional depending on the student's desires and ability. Safety precautions and procedures will be stressed. Life saving techniques to use in shock cases and other types of accidents will be taught. Use of the volt-ohmmeter and megger will be demonstrated in maintenance and repair situations.

EL 44 ADVANCED ELECTRICAL CONSTRUCTION LAB 3 Credits—144 Hours

The student will perform actual installation of rigid metal conduit and electrical metallic tubing. He will learn proper procedures for cutting and threading rigid conduit and the cutting and use of connectors with metallic tubing. He will learn how to bend conduit and tubing so that it will be bent in the right places and the right lengths. After the conduit is installed he will learn how to pull in the wire and wire up the devices which are being installed in the conduit system.

EM 11 DIRECT CURRENT FUNDAMENTALS 48 Hours

A study of basic electrical laws, electrical terms, wire calculations, magnetism and electro-magnetism resistivity and conductance, batteries and other sources of electricity, static electricity and behavior of charges. Basic principles and operation of electrical meters and instruments. Study of the mechanical generation of electricity. Principles and operation of shunt, series and compound DC generators and motors.

EM 12 BASIC WIRING LABORATORY 96 Hours

A beginning laboratory course to acquaint the student with the tools and materials of the trade, the proper use and care of hand tools, soldering and splicing of wires and instruction in the hook-up of basic circuits. The student will receive instruction in the wiring of bell and annunciator circuits, residential lighting and receptacle circuits, and low-voltage switching and control circuits for the home and the hook-up of various kinds of fluorescent lights.

EM 13 DIRECT CURRENT LABORATORY 96 Hours

Demonstrations showing proof of basic electrical formulas. Experiments for student participation to show parallel and series circuits, voltage drop in conductors, change of resistance with temperature, power, and energy, magnetism, batteries, and capacitors. Hook-up of DC generators and motors, and paralleling of DC generators. Actual practice in the use of electrical instruments.

EM 18 MOTOR REWINDING 200 Hours

In this course the student starts out with simple split-phase motors for practice rewinding. The student then progresses through several types of single-phase motors, wound armatures, three-phase motors, DC motors, both field and armatures. To be successful the student must develop skill and speed in working on motors and in rewinding them. Class periods as necessary are held to teach the student about the different kinds and types of windings and how to hook them up within the motor.

EM 21 ALTERNATING CURRENT FUNDAMENTALS 48 Hours

A study of the nature of alternating electricity as generated by machines. A study of impedance, inductive and capacitive reactance, power factor applications, converters, rectifiers and transformers. Current and voltage relationships in single and polyphase systems, vector representative and calculations. Principles and operation of AC instruments. Generation and distribution of alternating current, operation phasing and synchronization of AC generators. Principles and operation of AC motors such as the shaded pole, motor, split phase, repulsion-induction, squirrel cage and wound-rotor motors.

EM 22 ALTERNATING CURRENT LABORATORY 96 Hours

Laboratory experiments to show the effects of inductance, capacitance, impedance, leading and lagging power factor and power factor correction. Connection and operation of AC rotating equipment, motors, and alternators and the paralleling of alternators.

EM 25 MACHINE SHOP PRACTICE 100 Hours

In this course the student learns how to use various mechanical tools such as a drill press, bench grinder, hydraulic press and engine lathe. He is taught how to make sleeve bearings and other parts and how to turn down commutators.

EM 28 MOTOR REWINDING 200 Hours

In this course the student starts out with simple split-phase motors for practice rewinding. The student then progresses through several types of single-phase motors, wound armatures, three-phase motors, DC motors, both field and armatures. To be successful the student must develop skill and speed in working on motors and in rewinding them. Class periods as necessary are held to teach the student about the different kinds and types of winding and how to hook them up within the motor.

EM 34 MOTOR CONTROL AND SERVOMECHANISM LABORATORY 96 Hours

Laboratory assignments involving wiring of starting and control equipment for DC and AC motors including start-stop, forward-reverse, and jogging push-button stations, speed controls, plugging and dynamic braking circuits. Hook-up of various types of servo motors to show their application in industry.

EM 35 RESIDENTIAL WIRING AND CODE 32 Hours

A study of residential wiring circuits, including low voltage remote control switching and electric heating. A thorough study of the National Electrical Code relative to the use of the code book and its provisions dealing with residential and other types of wiring.

EM 36 ELECTRICAL REPAIR AND MAINTENANCE 96 Hours

This is a laboratory course designed to give the student practical experience in the repair and maintenance of many kinds of electrical equipment. It includes methods for cleaning and lubrication of motors, drying out and testing of motors that have been in flood conditions, replacement of bearings and centrifugal starting devices. Analysis of circuit or connection faults, repair or replacement of defective switches, relays, signal lights or other control devices. Trouble shooting on inoperative equipment such as motors, starters, lighting fixtures, and appliances of various kinds.

EM 38 MOTOR REWINDING 200 Hours

In this course the student starts out with simple split-phase motors for practice rewinding. The student then progresses through several types of single-phase motors, wound armatures, three-phase motors, DC motors, both field and armatures. To be successful the student must develop skill and speed in working on motors and in rewinding them. Class periods as necessary are held to teach the student about the different kinds and types of windings and how to hook them up within the motor.

EM 45 HOUSEHOLD APPLIANCE REPAIR 176 Hours

This course includes the replacement of cords and heating elements and the testing and adjusting of thermostats on electric irons. The repairing of toasters, waffle irons, hair dryers, vacuum cleaners and other small appliances.

EM 46 REPAIR OF ELECTRICAL POWER EQUIPMENT 176 Hours

This course includes the repair and adjustment of motor contractors, push button stations and relays. Rewinding and phasing of small transformer coils. Replacing of faulty rectifier plates. Repairing of laboratory equipment and other electrical equipment belonging to the college.

EM 48 MOTOR REWINDING 168 Hours

In this course the student starts out with simple split-phase motors for practice rewinding. The student then progresses through several types of single-phase motors, wound armatures, three-phase motors, DC motors, both field and armatures. To be successful the student must develop skill and speed in working on motors and in rewinding them. Class periods as necessary are held to teach the student about the different kinds and types of windings and how to hook them up within the motor.

ET 11 BASIC ELECTRICITY 5 Credits—80 Hours

Fundamental theory of the basic electrical quantities (resistance, inductance, and capacitance) including their response to constant, sinusoidal and general driving functions; analysis of series and parallel circuits; resonance; the phenomena of magnetism and electromagnetism; electrical measuring instruments.

ET 12 BASIC ELECTRICAL LABORATORY 3 Credits—144 Hours

Basic manipulative skills of soldering, component assembly and electrical measurement; application of constant and sinusoidal driving functions to series and parallel circuits. Must be taken with ET 11.

ET 21 ELEMENTARY ELECTRONICS 5 Credits—80 Hours

The electron theory and its application to thermionic vaccum tubes, diodes, triodes, tetrodes, pentodes, and special application tubes; detailed analysis of the basic amplifier stage; classes of amplifiers; gain and frequency considerations; inverse feedback; power supplies and filters; detectors.

PREREQUISITE: ET 11

ET 22 ELEMENTARY ELECTRONICS LABORATORY 3 Credits—144 Hours

Construction and testing of complete systems such as audio amplifiers on metal chassis; measurement of gain, frequency response and distortion; inverse feedback behavior; use of more complicated laboratory instruments such as oscilloscopes and signal generators. Must be taken with ET 21.

ET 23 CIRCUIT ANALYSIS 3 Credits—48 Hours

The study of electronic circuits and their practical application to amplifiers, power supplies, receivers and transmitters.

PREREQUISITE: ET 11

ET 31 ADVANCED ELECTRONICS 5 Credits—80 Hours

Detailed study of electronic devices such as oscillators, TRF and superheterodyne receivers; antennas and transmission lines.

PREREQUISITE: ET 21

ET 32 ADVANCED ELECTRONICS LABORATORY 3 Credits—144 Hours

Construction and testing of sophisticated electronic equipment such as transmitters, modulated and unmodulated; TRF and superheterodyne receivers; written laboratory reports. Also the construction and testing of solid state devices; transistor amplifiers and oscillators; multivibrators. Must be taken with ET 31.

ET 41 PRINCIPLES OF TELEVISION 5 Credits—80 Hours

Complete study of the cathode ray tube; the principle by which television operates; an analysis of the television signal; television receivers, including video amplifiers, AGC, synchronize and sweep circuits; cameras. Also the theory of color television.

PREREQUISITE: ET 31

ET 42 TELEVISION LABORATORY 3 Credits—144 Hours

Laboratory analysis of video, sync., AGC, vertical and horizontal output circuits. Waveform analysis. Familiarization with wide-band oscilloscopes; alignment of TV receivers. Must be taken with ET 41.

ET 43 TRANSISTORS 3 Credits—48 Hours

The study of solid state devices, transistors, zener and tunnel diodes, silicon controlled rectifiers, and their practical applications in receivers, amplifiers, power supplies, phonographs and control mechanisms.

PREREQUISITE: ET 31

EW 11 DIRECT CURRENT FUNDAMENTALS 48 Hours

A study of basic electrical laws, electrical terms, wire calculations, magnetism and electro-magnetism, resistivity and conductance, batteries and other sources of electricity, static electricity and behavior of charges. Basic principles and operation of electrical meters and instruments. Study of the mechanical generation of electricity. Principles and operation of shunt, series and compound DC generators and motors.

EW 12 BASIC WIRING LABORATORY 96 Hours

A beginning laboratory course to acquaint the student with the tools and materials of the trade, the proper use and care of hand tools, soldering and splicing of wires and instruction in the hook-up of basic circuits. The student will receive instruction in the wiring of bell and annunciator circuits, residential lighting and receptacle circuits and low voltage switching and control circuits for the home and the hookup of various kinds of fluorescent lights.

EW 13 DIRECT CURRENT LABORATORY 96 Hours

Demonstrations showing proof of basic electrical formulas. Experiments for student participation to show parallel and series circuits, voltage drop in conductors, change of resistance with temperature, power and energy, magnetism, batteries and capacitors. Hook-up of DC generators and motors and paralleling of DC generators. Actual practice in the use of electrical instruments.

EW 21 ALTERNATING CURRENT FUNDAMENTALS 48 Hours

A study of the nature of alternating electricity as generated by machines. A study of impedance, inductive and capacitive reactance, power factor applications, converters, rectifiers and transformers. Current and voltage relationships in single and polyphase system, vector representation and calculations. Principles and operation of AC instruments. Generation and distribution of alternating current, operation, phasing and synchronization of AC generators. Principles and operation of AC motors such as the shaded pole motor, split phase, repulsion-induction, squirrel cage and wound rotor motors.

EW 22 ALTERNATING CURRENT LABORATORY 96 Hours

Laboratory experiments to show the effects of inductance, capacitance, impedance, leading and lagging power factor and power factor correction. Connection and operation of transformers in single and three phase circuits. Connection and operation of AC rotating equipment, motors and alternators and the paralleling of alternators.

EW 31 BASIC ELECTRICAL CONSTRUCTION LABORATORY 96 Hours

This lab will give the student actual experience in the use and installation of many kinds of electrical materials used in the trade. He will learn to install house-wiring circuits in an actual home built by the building-trade students. He will learn to properly install wiring boxes of many kinds and how to use and run armored cable, wiremold, and romex. He will install fluorescent and incandescent lights, switches, and receptacle circuits under actual conditions.

EW 32 INDUSTRIAL ELECTRONICS 48 Hours

A study of Electron Tube and Semiconductor principles, characteristics and problems. Lecture-demonstration sessions include gaseous rectifiers, silicon controlled rectifiers, phototubes, saturable reactors, electronic power supplies, amplifiers, oscillators, detectors, motor control circuits, and servomechanisms, as used with electron tubes and semiconductor devices.

EW 34 MOTOR CONTROL AND SERVOMECHANISM LABORATORY 96 Hours

Laboratory assignments involving wiring of starting and control equipment for DC and AC motors including start-stop, forward-reverse, and jogging push-button stations, speed controls, plugging and dynamic braking circuits. Hook-up of various types of servo motors to show their application in industry.

EW 35 RESIDENTIAL WIRING AND CODE 32 Hours

A study of residential wiring circuits, including low voltage remote control switching and electric heating. A thorough study of the National Electrical Code relative to the use of the code book and its provisions dealing with residential and other types of wiring.

EW 36 ELECTRICAL REPAIR AND MAINTENANCE 96 Hours

This is a laboratory course designed to give the student practical experience in the repair and maintenance of many kinds of electrical equipment. It includes methods for cleaning and lubrication of motors, drying out and testing of mo-

tors that have been in flood conditions, replacement of bearings and centrifugal starting devices. Analysis of circuit or connection faults, repair or replacement of defective switches, relays, signal lights or other control devices. Trouble shooting on inoperative equipment such as motors, starters, lighting fixtures, and appliances of various kinds.

EW 41 ELECTRONIC INSTRUMENTATION 96 Hours

This is an advanced course in measuring principles, transmission and telemetering control system, analytical instruments, potentiometer measurements and principles of closed loop servo systems. Problems involving dynamic limitations of electronic systems such as control lag, overshoot, stability and conversion of measured variables are discussed and given as theory assignments.

EW 43 ADVANCED MAINTENANCE AND REPAIR LABORATORY 144 Hours

This will be a continuation of the basic lab to increase the student's skill in using tools and diagnosing of troubles. The student will learn to wind small transformers and coils. Motor rewinding will be optional depending on the student's desires and ability. Safety precautions and procedures will be stressed. Life-saving techniques to use in shock cases and other types of accidents will be taught. Use of the volt ohmmeter and megger will be demonstrated in maintenance and repair situations.

EW 44 ADVANCED ELECTRICAL CONSTRUCTION LABORATORY 136 Hours

The student will perform actual installation of rigid metal conduit and electrical metallic tubing. He will learn proper procedures for cuttting and threading rigid conduit and the cutting and use of connectors with metallic tubing. He will learn how to bend conduit and tubing so that it will be bent in the right places and to the right lengths. After the conduit is installed he will learn how to pull in the wire and wire up the devices which are being installed in the conduit system.

GA 10 REPRODUCTION PROCESSES 1 Credit—16 Hours

A study of the integral equipment and materials used in the various fields of printing and publishing. Lectures cover such topics as graphic-arts machinery, papers, inks, plates and qualifications of workers in this occupation which are deemed desirable.

GA 11 PHOTO PROCESS I 3 Credits—112 Hours

A practical course in the use of cameras in photo-lithography. Laboratory experiences are provided in set-up, operation and darkroom procedures employed in reproduction line work.

GA 12 OFFSET STRIPPING I 2 Credits—64 Hours

A study of the various types of stripping procedures and mediums used in photo-lithography. Laboratory experiences are provided in using the proper methods in stripping up the different formats.

GA 13 PLATEMAKING 2 Credits—64 Hours

A practical course in the proper platemaking and processing procedures for various types of plates and proofing material. Laboratory experiences provide applications of various types of systems to insure register.

GA 20 COPY PREPARATION I 2 Credits—64 Hours

A practical course in the basic principles of printing design and layout. A study of the skills and laboratory experiences will be provided in their application.

PREREQUISITE: GA 10

GA 21 PHOTO PROCESS II 2 Credits—96 Hours

An advanced course in the handling of films in making contacts, lateral reversals, spreads, chokes, duplicates and surprints.

PREREQUISITE: GA 11

GA 22 COLD COMPOSITION I 1 Credit—48 Hours

A study of the various kinds and types of equipment for producing an image with photographic qualities. Laboratory experiences are provided to allow the student to compose justified text, tabular and form work.

PREREQUISITE: GA 10

GA 24 PRESS OPERATION I 3 Credits—112 Hours

A study of the kinds and sizes of lithographic presses and the basic principles involved. Laboratory experiences are provided in preparation, operation and preventive maintenance of pressroom equipment.

GA 25 MATERIALS OF PRINTING PRODUCTION 1 Credit—16 Hours

Emphasis is placed on the study of the properties of paper, and coatings and ink as related to the printing field. Experiments are conducted to identify the numerous samples.

PREREQUISITE: GA 10

GA 30 COPY PREPARATION II 2 Credits—64 Hours

An advanced course which provides further opportunity to stimulate creative thinking in producing layouts with individual tastes while exercising good judgment.

PREREQUISITE: GA 20

GA 31 PUBLICATION PHOTOGRAPHY 2 Credits—64 Hours

Fundamentals of photographic theory and practice, including cameras, picture-taking, developing, enlarging, printing and nomenclature of the camera.

GA 32 COLD COMPOSITION II 1 Credit—48 Hours

Emphasis on laboratory experiences in type selection, copyfitting, justification and machine exercises as assigned.

PREREQUISITE: GA 22

GA 33 PHOTO COMPOSITION 1 Credit—48 Hours

An introduction to various types of equipment and materials used in photo composing. Laboratory experiences are provided in photo composing heads, ads and related matter.

GA 34 SCREEN PROCESS 1 Credit—48 Hours

Studies will emphasize the use and versatility of the screen process with problems and solutions provided in laboratory experiences.

GA 40 BINDERY METHODS AND PROCEDURES 2 Credits—64 Hours

As the bindery is the final department to handle the jobs from the printing department, discussions and practical approaches will cover such operations as: inspecting, collating, inserting, trimming, punching, round cornering, scoring, perforating, padding, folding and stitching.

PREREQUISITE: GA 10

GA 41 PHOTO PROCESS III 3 Credits—112 Hours

A further opportunity to develop background skills and to acquire knowledge in halftone negative making with an analysis of various halftones in relation-

ship to printing processes and paper requirements. An introduction to color separation and a study of the various techniques.

PREREQUISITES: GA 11 and GA 21

GA 42 OFFSET STRIPPING II — 3 Credits—112 Hours

An advanced course in procedures of stripping flats with color work and halftones. Practical approaches to maintain proper register will be stressed.

PREREQUISITE: GA 12

GA 43 DIRECT IMAGE — 2 Credits—64 Hours

A practical approach to the utilization of transfer methods in making economical reproductions.

PREREQUISITES: GA 10, GA 11, GA 12, and GA 13

GA 44 PRESS OPERATION II — 3 Credits—112 Hours

An advanced course in the production of the various printed pieces including work and turn, work and tumble and sheet wise forms. Laboratory experiences will be provided in mixing and matching ink letdowns or a base system.

PREREQUISITE: GA 24

GA 45 CREATIVE GRAPHIC ARTS PROJECT — 2 Credits—64 Hours

An individual assignment which will result in the student's doing the planning and design, composition and make-up, and printing and binding.

MD 10 BASIC DRAFTING I — 4 Credits—128 Hours

A study of basic drafting for those who major in Mechanical Engineering Drafting Technology and Mechanical Drafting. Course includes the use of drawing instruments, lettering, geometric construction, orthographic projection, isometric drawings, sectioning, dimensioning, auxiliary views, revolutions, and free-hand sketching. (To be scheduled with MD 11.)

MD 11 BASIC DRAFTING II — 4 Credits—128 Hours

A study of drafting for those who major in Mechanical Engineering Drafting Technology. Course includes screwthreads and fastening devices, working drawings, assembly drawings, installation drawings, sheet metal intersections and developments. (To be scheduled with MD 10.)

MD 20 APPLIED DRAFTING TECHNIQUES I — 4 Credits—128 Hours

A study of drafting for those who major in Mechanical Engineering Drafting Technology and Mechanical Drafting. Course includes the making of fairly complicated detail drawings to conform to industrial and military standards, including tolerance dimensioning. (To be scheduled with MD 21.)

PREREQUISITES: DC 10 and DC 12

MD 21 APPLIED DRAFTING TECHNIQUES II — 4 Credits—128 Hours

A study of drafting for those who major in Mechanical Engineering Drafting Technology. Course includes the the making of more complicated detail drawings. Here the student is required to apply his knowledge of drafting in making drawings from industrial castings and redesigning castings into weldments. (To be scheduled with MD 20.)

MD 30 MECHANISMS I — 4 Credits—128 Hours

A study of drafting for those who major in Mechanical Engineering Drafting Technology and Mechanical Drafting. Course includes a study of power transmissions. (To be scheduled with MD 31.)

PREREQUISITES: MD 10 and MD 11

MD 31 MECHANISMS II — 4 Credits—128 Hours

A study in drafting for those who major in Mechanical Engineering Drafting Technology. Course includes a study of the motion in machines such as cams and linkages. (To be scheduled with MD 30.)

MD 40 ADVANCED DETAILING — 4 Credits—128 Hours

A study in drafting for those who major in Mechanical Engineering Drafting Technology and Mechanical Drafting. Course includes an advanced study and application of drafting using layouts from industry to make detail and sub-assembly drawings. Also included are geometric tolerancing, true position dimensioning, and surface finishing according to military standards. (To be scheduled with MD 41.)

PREREQUISITES: MD 10, MD 11, MD 20, and MD 21

MD 41 ADVANCED DETAIL & DESIGN — 4 Credits—128 Hours

A study of drafting for those who major in Mechanical Engineering Drafting Technology. Course includes the most advanced study of drafting, the designing of a small machine or product, parts lists, and numbering systems. (To be scheduled with MD 41.)

MG 10 BENCH WORK — 60 Hours

Learning the use of hand tools to produce layouts and objects by hand. Simple filing, sawing, and assembling.

MG 11 DRILL PRESS — 52 Hours

Types of drill presses, drill sharpening, drilling to a layout and use of drill jigs.

MG 12 ENGINE LATHE — 150 Hours

Turning, facing, boring, tool-bit grinding, thread cutting.

MG 13 MILLING MACHINES — 150 Hours

End, slab, and straddle milling including all types of straight and plain milling operations.

MG 14 SHAPER — 60 Hours

Producing parallel, and square surfaces, shaping rectangular objects.

MG 20 TURRET LATHE AND AUTOMATIC SCREW MACHINES — 216 Hours

Setup and operation of machines. Sequence of tooling, cam development.

MG 21 INSPECTION AND BLUEPRINT READING — 208 Hours

Use of precision instruments, checking shop jobs as completed. Reading mechanical drawings. Making freehand sketches that can be passed on to carry the message to the shop for the part development.

MG 30 BENCH WORK — 70 Hours

Advanced precision filing, fitting, lapping, and assembling of precision parts as required on dies, jigs and fixtures.

MG 31 DRILL PRESS — 20 Hours

Setting up and drilling to a very close tolerance. Drilling to magnified lines.

MG 32 JIB BORER — 60 Hours

Boring holes to very close dimensions and location, using micrometer measuring instruments on the machine.

MG 33 ENGINE LATHE 190 Hours

Advanced turning, face plate and chuck work. Thread cutting of all types of threads. Taper work.

MG 34 MILLING MACHINES 150 Hours

Producing spur gears. All types of indexing, spiral and cam milling.

MG 35 SHAPER 30 Hours

Advanced shaping of angles, radii, dovetails and irregular shapes.

MG 40 GRINDING MACHINES 380 Hours

Cylindrical, internal, surface, tool and cutter grinding. Thread grinding of studs, taps, etc. Use and types of grinding wheels and machines.

MG 41 HEAT TREATING 140 Hours

Normalizing, carburizing, hardening, and tempering of various types of steel. Heat treatment of metals.

MO 10 SAFETY EDUCATION AND LUMBER, VENEERS AND PLYWOOD 48 Hours

Safety Education as it applies to a machine operator will naturally find great emphasis being placed on safety zones, the position and stance of the operator as well as methods of guarding the machines. Posters, slogans, and movies by the Manufacturers Association will be on display or shown as well as lectures by representatives of the Association.

MO 11 HAND TOOLS 48 Hours

While pursuing a course of hand tool instruction as it relates to a machine operator, stress must be placed on the absolute correct use of the various tools used by an operator. The use of the protractor, caliper, and micrometer must be mastered.

MO 12 BLUEPRINT READING SHOP, DRAWINGS AND LAYOUT 48 Hours

Familiarization with orthographic projection and ability to read and interpret shop drawings must be emphasized. Full size details must be carefully studied in order to understand the method of construction required by a given manufacturer. Actual shop drawings used by industry and loaned to use will be used in order that the student, upon completion of the course, will have a working knowledge and be familiar with the real thing.

MO 13 SHOP MATH 48 Hours

Mathematics that will assist the student to correctly read his rule and change from tenths to sixteenths, as well as twelfths, must be carefully undertaken. Fractions, decimals, percentages and discounts are an important part of the Shop Math course.

MO 14 HAND OPERATIONS 48 Hours

Any operation that must be performed by hand in order that the machine operator can function properly must be mastered; namely, the use of such tools as a machine operator must be familiar with in order to properly set up and operate for a given piece that is to go on production. Basic fundamentals of hand tools including rules, scales, heighth gauges, and wrenches must be mastered.

MO 15 FASTENING AND HOLDING DEVICES 16 Hours

The proper methods of fastening a number of pieces to make a finished product must be carefully studied as well as various ways and means of accomplishing

your goal. Numerous holding devices, such as clamps, screws, nails, glue, etc., will be studied.

MO 16 PORTABLE POWER TOOLS 48 Hours

The various power tools used by a machine operator to become an efficient and capable mechanic will be stressed. Straight line sanders, orbital sanders, electric drills, electric screw drivers, saber saws, circular saws and routers will be used to develop the necessary skills of operation.

MO 17 POWER SANDING 16 Hours

In order that any finished product look professional, correct procedure and methods of using both hand and power sanding equipment must be stressed. Methods of applying paper to the discs, drums, and spindles will be discussed, as well as the type and kind of adhesive to use. The application of the felt to the drum sander, as well as ways of applying the garnet to the drum, will be studied.

MO 18 PRODUCTION JIGS AND FIXTURES 176 Hours

The method and procedure that is required to produce jigs and fixtures that will adequately stand up under production techniques must be built by students for various jobs or projects. This involves design, construction, and application to a given project that a production or machine operator may be called upon to perform.

MO 19 ASSEMBLY, GLUING & CLAMPING 32 Hours

Assembly, gluing, and clamping is a relatively small part of a machine operator's duties, therefore, only the essential information on how to properly assemble, glue, and clamp stock together will be stressed.

MO 20 STOCK BILLING 16 Hours

Stock billing, as used by the local industries, will be studied. This will consist of taking drawings furnished by a local plant and listing the cutting orders needed to do a specific order.

MO 21 WOOD SHOP MACHINES 144 Hours

Instruction in the safe use and operation of any machine that a machine operator may be called upon to operate will be stressed; namely, crosscut and rip saws, planers, jointers, band saws and straight line up, as well as double end cut offs. During the course, emphasis will be placed on proper installation of new blades, as well as lubrication. The student will also be taught the various operations that can be performed safely on each machine.

MO 22 PRODUCTION TECHNIQUES 48 Hours

It is at this point in the student's training program that he learn how to produce duplicate parts with small tolerances with speed and dispatch. In order to accomplish the above results, plant visitation may be made to study the production techniques used by the various industries in performing corresponding work. Shop jobs will be routed as in industry and standards set up and stressed, that the finished product could well meet industrial specifications.

MO 23 MOULDER SET UP 96 Hours

Since moulder set up and operation is one of the most difficult of all woodworking machines to set up and operate safely, it behooves one to spend a great deal of care and patience in making sure they know just what they are doing beyond any question of a doubt. The student must be so trained that he has confidence in his own set up and can perform the duty with no mental reservation and with a steadfast resolution to keep and perform the same,

knowing he has done his best and everyone is safe, and the job will be according to a given drawing or specification.

MO 24 TENNENOR SET-UP — 16 Hours

The student will be taught how to make a tennenor set-up so that the finished pieces can be assembled, making proper allowances for glue and assembly. Methods of holding stock while performing various cuts must be discussed and studied so that safety is always observed, as well as guarding the machine when not in actual use.

MO 25 MORTISING — 16 Hours

The proper method of setting up a hollow chisel mortiser or boring machine must be carefully stressed in order that 1/64" tolerances can be observed.

MO 26 MACHINE PRODUCTION — 144 Hours

This course includes the proper use of any or all woodworking machines that may be needed to perform a given assignment. The main objective of this course is to stress professional standards.

MO 27 KNIFE LAYOUT AND GRINDING — 48 Hours

The student must learn what dies to use for laying out and how to use scribers before he undertakes the grinding. Freehand grinding to a given line on practice materials is very important before one should attempt to perform these duties on a piece of high carbon tool steel that is much harder and more expensive. The balancing of knives must also be studied and practiced.

OM 11 INTRODUCTION TO TYPEWRITERS — 1 Credit—48 Hours

An introduction to component parts of Standard Typewriters.

OM 12 MACHINE TESTING — 1 Credit—48 Hours

The testing of typewriters and their operational functions.

OM 13 THEORY — 2 Credits—32 Hours

A study of typewriter ribbons, machine models, rubber parts, cleaning methods, etc.

OM 14 SERVICE WORK — 1 Credit—48 Hours

Training the student to perform periodic inspection service for preventative maintenance.

OM 15 TYPEWRITER SECTIONS — 2 Credits—96 Hours

An analysis of typewriter sections: Backspacer, Margins, Tabulator, Escapement, Ribbon Feed and Reverse, Bichrome, Shift, and Paper Feed.

OM 21 DISASSEMBLY AND REASSEMBLY — 3 Credits—144 Hours

Typewriters are disassembled to give the student an understanding of the structure of these machines, the relation of one machine section to all other sections, and then reassembled to show the sequence of component parts.

OM 22 WORK JOBS — 2 Credits—96 Hours

This unit presents the repair of individual parts and sections of typewriters, the trade procedure for cleaning, oiling and adjusting typewriters, and trade procedure for reconditioning typewriters.

OM 23 ELECTRIC TYPEWRITERS — 2 Credits—96 Hours

Electric typewriters are introduced to familiarize the student to the Drive, Power Roll, Type Action, and controlled operations of these machines.

OM 31 INTRODUCTION TO ADDING MACHINES 1 Credit—48 Hours

A study of the history, business use, and component sections of adding machines.

OM 32 APPLICATION OF ADDING MACHINES 1 Credit—48 Hours

Full Keyboard and ten-key adding machine operation, use of adding machine on practical problems, and testing of machine functions.

OM 33 SERVICE OF ADDING MACHINES 1 Credit—48 Hours

Training of the student to perform periodic inspection service for preventative maintenance.

OM 34 ADJUSTMENT & REPAIR OF ADDING MACHINES 2 Credits—96 Hours

Prominent mechanical problems are presented and proper adjustment to correct these problems are covered.

OM 35 CREDIT BALANCE ADDING MACHINES 1 Credit—48 Hours

Credit balance adding machines are introduced to develop understanding of the more complex functions of adding machines.

OM 41 INTRODUCTION TO DUPLICATING MACHINES 1 Credit—48 Hours

Theory presentation of Stencil Duplicating Arts, lettering and layout, use of scope.

OM 42 OPERATION OF DUPLICATING MACHINES 1 Credit—48 Hours

Machine set-up, color changing, operational functions on stencil duplicators, and typing of masters and operation of spirit machines.

OM 43 SERVICE & REPAIR OF DUPLICATING MACHINES 2 Credits—96 Hours

Training of students to perform periodic service, and the repair of the parts and sections of duplicating machines.

OM 44 INTRODUCTION TO CALCULATING MACHINES 1 Credit—48 Hours

An introduction study of Multipliers, Semi-Automatic Calculators, Automatic Calculators, both rotary and printing.

OM 45 MOTOR CIRCUITS 1 Credit—48 Hours

Theory and practical work on electrical circuits and power transmission on office machines.

OM 46 OFFICE MACHINES BUSINESS MANAGEMENT 4 Credits—64 Hours

Presentation of a business management program to enable the student to understand the work process of the office machine trade.

OP 10 REPRODUCTION PROCESSES 16 Hours

A study of the integral equipment and materials used in the various fields of printing and publishing. Lectures cover such topics as graphic-arts machinery, papers, inks, plates and qualifications of workers in this occupation which are deemed desirable.

OP 11 PHOTO PROCESS I 128 Hours

A practical course in the use of cameras in photo-lithography. Laboratory experiences are provided in setup, operation and darkroom procedures employed in reproduction line work.

OP 12 OFFSET STRIPPING I 128 Hours

A study of the various types of stripping procedures and mediums used in photo-lithography. Laboratory experiences are provided in using the proper methods in stripping up the different formats.

OP 13 PLATEMAKING 136 Hours

A practical course in the proper platemaking and processing procedures for various types of plates and proofing material. Laboratory experiences provide applications of various types of systems to insure register.

OP 20 COPY PREPARATION I 96 Hours

A practical course in the basic principles of printing design and layout. A study of the skills and laboratory experiences will be provided in their application.
PREREQUISITE: OP 10

OP 21 PHOTO PROCESS II 112 Hours

An advanced course in the handling of films in making contacts, lateral reversals, spreads, chokes, duplicates and surprints.
PREREQUISITE: OP 11

OP 22 COLD COMPOSITION I 96 Hours

A study of the various kinds and types of equipment for producing an image with photographic qualities. Laboratory experiences are provided to allow the student to compose justified text, tabular and form work.
PREREQUISITE: OP 10

OP 24 PRESS OPERATION I 152 Hours

A study of the kinds and sizes of lithographic presses and the basic principles involved. Laboratory experiences are provided in preparation, operation and preventive maintenance of pressroom equipment.

OP 25 MATERIALS OF PRINTING PRODUCTION 16 Hours

Emphasis is placed on the study of the properties of paper, and coatings and ink as related to the printing field. Experiments are conducted to identify the numerous samples.
PREREQUISITE: OP 10

OP 30 COPY PREPARATION II 96 Hours

An advanced course which provides further opportunity to stimulate creative thinking in producing layouts with individual tastes while exercising good judgment.
PREREQUISITE: OP 20

OP 31 PUBLICATION PHOTOGRAPHY 64 Hours

Fundamentals of photographic theory and practice, including cameras, picture-taking, developing, enlarging, printing and nomenclature of the camera.

OP 32 COLD COMPOSITION II 96 Hours

Emphasis on laboratory experiences in type selection, copy fitting, justification and machine exercises as assigned.
PREREQUISITE: OP 22

OP 33 PHOTO COMPOSITION 96 Hours

An introduction to various types of equipment and materials used in photo composing. Laboratory experiences are provided in photocomposing heads, ads, and related matter.

OP 34 SCREEN PROCESS 120 Hours

Studies will emphasize the use and versatility of the screen process with problems and solutions provided in laboratory experiences.

OP 40 BINDERY METHODS AND PROCEDURES 64 Hours

As the bindery is the final department to handle the jobs from the printing department, discussions and practical approaches will cover such operations as: inspecting, collating, inserting, trimming, punching, round cornering, scoring, perforating, padding, folding and stitching.

PREREQUISITE: OP 10

OP 41 PHOTO PROCESS III 112 Hours

A further opportunity to develop background skills and to acquire knowledge in halftone negative making with an analysis of various halftones in relationship to printing processes and paper requirements. An introduction to color separation and a study of the various techniques.

PREREQUISITES: OP 11 and OP 21

OP 42 OFFSET STRIPPING II 112 Hours

An advanced course in procedures of stripping flats with color work and halftones. Practical approaches to maintain proper register will be stressed.

PREREQUISITE: OP 12

OP 43 DIRECT IMAGE 96 Hours

A practical approach to the utilization of transfer methods in making economical reproductions.

PREREQUISITES: OP 10, OP 11, OP 12, and OP 13

OP 44 PRESS OPERATION II 136 Hours

An advanced course in the production of the various printed pieces including work and turn, work and tumble and sheet wise forms. Laboratory experiences will be provided in mixing and matching ink let-downs or a base system.

PREREQUISITE: OP 24

OR 11 INTRODUCTION TO TYPEWRITERS 100 Hours

An introduction to the component parts of Standard Typewriters.

OR 12 MACHINE TESTING 90 Hours

The testing of typewriters and their operational functions.

OR 13 THEORY 100 Hours

A study of typewriter ribbons, machine models, rubber parts, cleaning methods, etc.

OR 14 SERVICE WORK 100 Hours

Training the student to perform periodic inspection service for preventative maintenance.

OR 15 PRODUCTION WORK 82 Hours

Live work on school and training machines.

OR 21 TYPEWRITER SECTIONS 200 Hours

An analysis of typewriter sections, and disassembly of typewriters to give the student an understanding of the structure of these machines, the relation of one machine section to all other sections.

OR 22 THEORY 92 Hours

Trade procedures, job standards, trade terms, type alignment. Introduction to electric motors and circuits.

OR 23 ELECTRIC TYPEWRITERS 132 Hours

Electric typewriters are introduced to familiarize the student to the drive, power roll, type action, and controlled operations of these machines.

OR 31 INTRODUCTION TO ADDING MACHINES 64 Hours

A study of the history, business use, and component sections of adding machines.

OR 32 APPLICATION OF ADDING MACHINES 64 Hours

Full Keyboard and Ten-Key adding machine operation, use of adding machine on practical problems, and testing of machine functions.

OR 33 SERVICE OF ADDING MACHINES 120 Hours

Training of the student to perform periodic inspection service for preventative maintenance.

OR 34 ADJUSTMENT AND REPAIR OF ADDING MACHINES 136 Hours

Prominent mechanical problems are presented and proper adjustment to correct these problems are covered.

OR 35 THEORY 88 Hours

Adding machine models, ribbons, machine tapes, hand drive, electric drive, machine control keys, complements, etc.

OR 41 INTRODUCTION TO DUPLICATING MACHINES 90 Hours

Theory presentation of Stencil Duplicating Arts, lettering and layout, use of scope.

OR 42 OPERATION OF DUPLICATING MACHINES 102 Hours

Machine set up, color changing, operational functions on stencil duplicators, and typing of masters and operation of spirit machines.

OR 43 SERVICE AND REPAIR OF DUPLICATING MACHINES 162 Hours

Training of students to perform periodic service, and the repair of the parts and sections of duplicating machines.

OR 44 MOTOR CIRCUITS 70 Hours

Theory and practical work on electrical circuits and power transmission on office machines.

OR 45 OFFICE MACHINES BUSINESS MANAGEMENT 48 Hours

Presentation of a business management program to enable the student to understand the work process of the office machine trade.

PI 10 DRAFTING 228 Hours

Instruction is given in basic drafting, sectional views, auxiliary views, revolutions, dimensioning, developments, intersections, assembly and detail drawings, gears, and cams.

PI 11 RENDERING I 228 Hours

This course provides fundamental training necessary to produce line and continuous tone drawings through the use of graphite pencil, carbon pencil, litho

pencil, as well as various types of pens and ink, Benday screen and scratch board.

PI 20 COLOR 212 Hours

This course provides color theory and training in the use and application of color. Full color rendering of products, as well as the use of flat colors and color aids such as Bourges art aids and color adhering sheets.

PI 21 PERSPECTIVE DRAWING 212 Hours

Instruction is given in one-point or parallel perspective, two-point or angular perspective. The projection method and the measuring plan methods are emphasized.

PI 30 RENDERING II 220 Hours

This course is a continuation of Rendering I. It provides the fundamental training and the necessary skills required to produce pictures in the following mediums: Wash, tempra, airbrush and photo retouching.

PI 31 AXONOMETRIC DRAWING 220 Hours

Instruction is given in isometric, dimetric and trimetric projections, along with instruction in the use of some of the more popular industrial drawing aids.

PI 32 LAYOUT AND DESIGN 64 Hours

This course provides training in the basic fundamentals of layout. The student is required to make sketches, designs, thumbnail sketches, comprehensives, with emphasis on technique, structure, mechanics, awareness, and communication.

PI 40 ILLUSTRATION PRACTICES 220 Hours

This course provides training in preparing art for technical manuals and diversified art. The student makes advanced drawings employing all or various combinations of art techniques learned. This enables the student to prepare a presentation folio preparatory to employment. This includes work in black and white, as well as color showing assemblies, cut-away, exploded views, spot drawings, visual aids, lettering aids, and art aids.

PI 41 TECHNICAL DRAWING 220 Hours

This phase of the course is a continuation of perspective and axonometric drawing courses. It is devoted to giving the student an opportunity to produce illustrations which will meet employment requirements. These illustrations include assembly, exploded, and cut-away views of mechanical objects.

PL 11 USE OF TOOLS, PLUMBING MATH., SEPTIC TANKS 224 Hours

Use of tools used by plumbers to cut and thread iron pipe, sweat copper fittings and pipes, caulking joints, lead tools, safety, bend pipe, power tools, etc. Instructions in making isometric drawings, pipe capacities, percentages, offsets, angles, pipe sizes, fittings, etc. Filter bends, subsoil irrigation, location, connection, soil, cesspools, cesspool construction, and septic tanks.

PL 13 BUILDING MAINTENANCE 114 Hours

Care and repair of and installing new flush valves, gate valves, globe valves, seats, washers, water lines, air lines, gas lines, steam lines, waste and soil lines, vents, tools, open stopped waste and soil lines, water closets, lavatories, urinals, drinking fountains, tubs, sinks, repair of faucets and bibbs, and pumps.

PL 14 LEAD WORKING (BASIC) 96 Hours

Use of lead working tools, joint wiping, method of bending lead pipe, preparing wiped joints, and tricks of the trade.

PL 15 STEAM HEATING (BASIC) 86 Hours

Types of steam heating systems, types of hot water heating systems, controls, valves, accessories, basic science, application of different heating systems, repairs, piping hookups, heat transfer equipment, etc.

PL 21 VENTING, DRAINAGE (BASIC) 160 Hours

This unit covers continuous, circuit, loop, relief, and wet units, traps, water closets, plumbing materials, ventilation of toilet rooms, by-passes on plumbing systems, stack venting, double vents, unit vents, siphonage, vent sizes, testing of plumbing systems, drainage from lavatories, water closets, bathtubs, sinks, bars, soda fountains, and area drains. Pipe sizes, yard drains, by-passes, etc.

PL 22 BLUEPRINT READING AND ESTIMATING 112 Hours

Signs and symbols for blueprint reading, use of estimating sheets, labor materials, take-off estimating of materials, isometric drawing, and trade terms.

PL 23 BUILDING MAINTENANCE (BASIC) 114 Hours

Care and repair of and installing new flush valves, gate valves, globe valves, seats, washers, water lines, air lines, gas lines, steam lines, waste and soil lines, vents, tools, open stopped waste and soil lines, water closets, lavatories, urinals, drinking fountains, tubs, sinks, repair of faucets and bibbs, and pumps.

PL 24 LEAD WORKING (BASIC) 68 Hours

Folding or pigear corners, patterns for cutting and preparing sheet lead, bossing corners, folding, bending corners, etc.

PL 25 HOT WATER HEATING (BASIC) 66 Hours

Types of steam heating systems, types of hot water heating systems, controls, valves, accessories, basic science, application of different heating systems, repairs, piping hookups, heat transfer equipment, etc.

PL 31 WATER DISTRIBUTION 160 Hours

Drinking fountains, water pumps, rams, water siphons, bathtubs, sinks. Cold water mains and risers, hot and cold water to water closets, lavatories, and country plumbing, direct and tank hot water systems, boiler explosions, repairs, relief valves, theory of circulation, automatic hot water heaters, etc.

PL 33 BUILDING MAINTENANCE (ADVANCED) 140 Hours

Care and repair and installing new flush valves, gate valves, globe valves, seats, washers, water lines, air lines, gas lines, steam lines, waste and soil lines, vents, tools, open stopped waste and soil lines, water closets, lavatories, urinals, drinking fountains, tubs, sinks, repair of faucets and bibbs, and pumps.

PL 34 LEAD WORKING (ADVANCED) 108 Hours

Preparing and tinning the soldering iron, tinning brass fittings, soldering flat seams and sheet lead, soldering angle seams on sheet lead, soldering lead pipe to closet floor flange, making cup joints, making overcast joints, bending lead waste pipe with spring, use of lead dresser, making offsets, etc.

PL 35 STEAM AND HOT WATER HEATING (ADVANCED) 112 Hours

Types of steam heating systems, types of hot water heating systems, controls, valves, accessories, basic science, application of different heating systems, repairs, piping hookups, heat transfer equipment, etc.

PL 41 VENTING, DRAINAGE (ADVANCED) 90 Hours

This unit covers continuous, circuit, loop, relief, and wet units, traps, water closets, plumbing materials, ventilation of toilet rooms, by-passes on plumbing systems, stack venting, double vents, unit vents, siphonage, vent sizes, testing of plumbing systems, drainage from lavatories, water closets, bathtubs, sinks, bars, soda fountains, and area drains. Pipe sizes, yard drains, by-passes, etc.

PL 43 BUILDING MAINTENANCE 94 Hours

Care and repair of and installing new flush valves, gate valves, globe valves, seats, washers, water lines, air lines, gas lines, steam lines, waste and soil lines, vents, tools, open stopped waste and soil lines, water closets, lavatories, urinals, drinking fountains, tubs, sinks, repair of faucets and bibbs, and pumps.

PL 44 LEAD WIPING 144 Hours

Care and cleaning of wiping solder, preparing wiping cloths, preparing and wiping floor flange joints, preparing and wiping horizontal round joints, preparing and wiping vertical branch joints, preparing and wiping horizontal branch joints, preparing and wiping lead to brass and copper, solder nipple to waste pipe, brass ferrules, capping lead stubs, preparing and wiping vertical round joints, etc.

PN 11 PERSONAL VOCATIONAL RELATIONSHIPS 36 Hours

Fundamentals of ethical, psychological, social, and human relationships. Civil, vocational, and legal implications. Personal and vocational growth.

PN 12 BODY STRUCTURE AND FUNCTION 36 Hours

Basic anatomy and physiology of the normal body. Concept of the process of reproduction.

PN 13 COMMUNITY HEALTH—PERSONAL HYGIENE 36 Hours

Good mental and physical health habits and their applications to personal and community living, disease transmission and control. Sanitary laws and methods commonly used to protect health and promote safety in the community. Appreciation of the importance of prenatal care.

PN 14 THE FAMILY 50 Hours

The stages of development and functions of the family. Conditions for successful family living. Normal growth and development of the child, characteristics of the aging process, and management of the home in health and illness.

PN 15 NUTRITION 50 Hours

Principles of nutrition, nutrition as an important factor in attaining physical fitness, food preparation, and modified diets.

PN 16 NURSING PRINCIPLES AND PRACTICE 268 Hours

The principles underlying nursing skills. Practice in order to develop the skills that serve as a foundation for safe nursing care.

PN 17 INTRODUCTION TO ILLNESS 38 Hours

A symptomatic approach to illness, in which the general deviations from normal body functions are considered together with such nursing problems as may arise from functional disturbances.

PN 18 DIVERSIONAL AND REHABILITATIVE ACTIVITIES 16 Hours

Overview of simple, recreational, diversional, and rehabilitative activities.

PN 19 SUPERVISED STUDY 75 Hours

Time set aside for the students to study under the supervision of an instructor.

PN 21 CARE OF MEDICAL AND SURGICAL PATIENTS 880 Hours

In this phase are: 9 weeks medical, 9 weeks surgical, 1 week central supply, 2 weeks recovery room and intensive care unit, 1 week diet kitchen service, including 150 hours planned instruction.

PN 22 CARE OF MOTHER AND NEW BORN INFANTS 240 Hours

This phase includes 4 weeks care of mother, 2 weeks care of new born, and 30 hours planned instruction.

PN 23 CARE OF CHILDREN 160 Hours

In this phase there are: 3 weeks pediatric service, 1 week nursery school, including 20 hours planned instruction.

PT 11 USE OF TOOLS, PLUMBING MATH., SEPTIC TANKS
4 Credits—192 Hours

Use of tools used by plumbers to cut and thread iron pipe, sweat copper fittings and pipes, caulking joints, lead tools, safety, bend pipe, power tools, etc. Instructions in making isometric drawings, pipe capacities, percentages, offsets, angles, pipe sizes, fittings, etc. Filter bends, subsoil irrigation, location, connection, soil, cesspools, cesspool construction, and septic tanks.

PT 12 THEORY 1 Credit—16 Hours

Use of tools used by plumbers to cut and thread iron pipe, sweat copper fittings and pipes, caulking joints, lead tools, safety, bend pipe, power tools, etc. Instructions in making isometric drawings, pipe capacities, percentages, offsets, angles, pipe sizes, fittings, etc. Filter bends, subsoil irrigation, location, connection, soil cesspools, cesspool construction, and septic tanks.

PT 13 BUILDING MAINTENANCE 2 Credits—96 Hours

Care and repair of and installing new flush valves, gate valves, globe valves, seats, washers, water lines, air lines, gas lines, steam lines, waste and soil lines, vents, tools, open stopped waste and soil lines, water closets, lavatories, urinals, drinking fountains, tubs, sinks, repair of faucets and bibbs, and pumps.

PT 15 STEAM AND HOT WATER HEATING 2 Credits—96 Hours

Types of steam heating systems, types of hot water heating systems, controls, valves, accessories, basic science, application of different heating systems, repairs, piping hookups, heat transfer equipment, etc.

PT 16 STEAM AND HOT WATER HEATING 1 Credit—16 Hours

Types of steam heating systems, types of hot water heating systems, controls, valves, accessories, basic science, application of different heating systems, repairs, piping hookups, heat transfer equipment, etc.

PT 20 VENTING AND DRAINAGE THEORY (BASIC) 1 Credit—16 Hours

This unit covers continuous, circuit, loop, relief, and wet units, traps, water closets, plumbing materials, ventilation of toilet rooms, by-passes on plumbing systems, stack venting, double vents, unit vents, siphonage, vent sizes, testing of plumbing systems, drainage from lavatories, water closets, bathtubs, sinks, bars and soda fountains, area drains. Pipe sizes, yard drains, by-passes, etc.

PT 21 VENTING AND DRAINAGE (BASIC) 2 Credits—96 Hours

This unit covers continuous, circuit, loop, relief, and wet units, traps, water closets, plumbing materials, ventilation of toilet rooms, by-passes on plumbing

systems, stack venting, double vents, unit vents, siphonage, vent sizes, testing of plumbing systems, drainage from lavatories, water closets, bathtubs, sinks, bars and soda fountains, area drains. Pipe sizes, yard drains, by-passes, etc.

PT 22 BLUEPRINT READING AND ESTIMATING 3 Credits—48 Hours

Signs and symbols for blueprint reading, use of estimating sheets, labor materials, take-off estimating of materials, isometric drawing, and trade terms.

PT 23 BUILDING MAINTENANCE 2 Credits—96 Hours

Care and repair of and installing new flush valves, gate valves, globe valves, seats, washers, water lines, air lines, gas lines, steam lines, waste and soil lines, vents, tools, open stopped waste and soil lines, water closets, lavatories, urinals, drinking fountains, tubs, sinks, repair of faucets and bibbs, and pumps.

PT 24 LEAD WORKING (BASIC) 2 Credits—96 Hours

Folding or pigear corners, patterns for cutting and preparing sheet lead, bossing corners, folding, bending corners, etc.

PT 25 STEAM AND HOT WATER HEATING 2 Credits—96 Hours

Types of steam heating systems, types of hot water heating systems, controls, valves, accessories, basic science, application of different heating systems, repairs, piping hookups, heat transfer equipment, etc.

PT 26 LEAD WORKING (BASIC) 1 Credit—16 Hours

Use of lead working tools, joint wiping, method of bending lead pipe, preparing wiped joints, and tricks of the trade.

PT 30 WATER DISTRIBUTION 1 Credit—16 Hours

Drinking fountains, water pumps, rams, water siphons, bathtubs, sinks. Cold water mains and risers, hot and cold water to water closets, lavatories, and country plumbing, direct and tank hot water systems, boiler explosions, repairs, relief valves, theory of circulation, automatic hot water heaters, etc.

PT 31 WATER DISTRIBUTION 3 Credits—144 Hours

Drinking fountains, water pumps, rams, water siphons, bathtubs, sinks. Cold water mains and risers, hot and cold water to water closets, lavatories, and country plumbing, direct and tank hot water systems, boiler explosions, repairs, relief valves, theory of circulation, automatic hot water heaters, etc.

PT 33 BUILDING MAINTENANCE (ADVANCED) 2 Credits—96 Hours

Care and repair of and installing new flush valves, gate valves, globe valves, seats, washers, water lines, air lines, gas lines, steam lines, waste and soil lines, vents, tools, open stopped waste and soil lines, water closets, lavatories, urinals, drinking fountains, tubs, sinks, repair of faucets and bibbs, and pumps.

PT 35 STEAM & HOT WATER HEATING (ADVANCED) 3 Credits—144 Hours

Types of steam heating systems, types of hot water heating systems, controls, valves, accessories, basic science, application of different heating systems, repairs, piping hookups, heat transfer equipment, etc.

PT 40 VENTING AND DRAINAGE THEORY (ADVANCED) 1 Credit—16 Hours

This unit covers continuous, circuit, loop, relief, and wet units, traps, water closets, plumbing materials, ventilation of toilet rooms, by-passes on plumbing systems, stack venting, double vents, unit vents, siphonage, vent sizes, testing of plumbing systems, drainage from lavatories, water closets, bathtubs, sinks, bars and soda fountains, area drains. Pipe sizes, yard drains, by-passes, etc.

PT 41 VENTING AND DRAINAGE (ADVANCED) 2 Credits—96 Hours

This unit covers continuous, circuit, loop, relief, and wet units, traps, water closets, plumbing materials, ventilation of toilet rooms, by-passes on plumbing systems, stack venting, double vents, unit vents, siphonage, vent sizes, testing of plumbing systems, drainage from lavatories, water closets, bathtubs, sinks, bars and soda fountains, and area drains. Pipe sizes, yard drains, by-passes, etc.

PT 44 LEAD WIPING 2 Credits—96 Hours

Care and cleaning of wiping solder, preparing wiping cloths, preparing and wiping floor flange joints, preparing and wiping horizontal round joints, preparing and wiping vertical branch joints, preparing and wiping horizontal branch joints, preparing and wiping lead to brass and copper, solder nipple to waste pipe, brass ferrules, capping lead stubs, preparing and wiping vertical round joints, etc.

SM 10 BASIC FUNDAMENTAL PROCESSES (HAND/MACHINE) 192 Hours

Introduction to sheet metal, care and use of sheet metal hand tools, shop hand equipment, safety, shop regulations, hand and machine processing of various metals; forming, crimping, seaming, beading, soldering, riveting, shearing, and use of patterns.

SM 11 SHEET METAL DRAFTING 144 Hours

Introduction, instruments and materials, instrument technique, geometric constructions, lettering, projections, auxiliary views, rotation, dimensioning, isometric and oblique sketching.

SM 12 BASIC COMMERCIAL SHEET METAL 136 Hours

Introduction to power actuated hand tools and equipment; shop math, theory, working from elementary blueprints, safety, machine maintenance; a continuation of SM 10 with increased emphasis on accuracy and advanced work, and shop projects.

PREREQUISITE: SM 10

SM 20 PRACTICAL PATTERN DRAFTING 144 Hours

Introduction to heating, ventilation, and air conditioning pattern development; parallel line development, all types of problems that require patterns to be developed by means of parallel lines, working drawings, and shop project drawings.

PREREQUISITE: SM 11

SM 21 CONSTRUCTION (SERVICE TRADES) 192 Hours

Introduction to the service trades, fields of employment, shop practices, management principles, shop projects and live jobs related to all phases of sheet metal, rigging, building codes, contracting, estimating.

SM 22 SHEET METAL DRAFTING 136 Hours

Sheet metal layout and development involving radial line, triangulation, and simplified triangulation methods, shop projects and live work, working from planning stage to completion, technical sketching.

PREREQUISITE: SM 20

SM 30 SHEET METAL WELDING 192 Hours

Introduction to basic welding procedures for light metals, position welding, use and care of equipment, theory and application, resistance welding, principles and techniques, oxy-acetylene and electric arc welding related to metal working trades, composition of various metals, weld testing procedures, and safety.

SM 31 BASIC COMMERCIAL SHEET METAL 144 Hours

Introduction to more costly metals, layout, fabrication, assembly, and repair of dairy, industrial, restaurant and hotel equipment; residential and commercial heating installations and controls, blueprint reading, estimating material and labor costs, ornamental sheet metal work, fire doors, underwriter specifications, special projects and live work.
PREREQUISITE: SM 12

SM 32 COMMERCIAL SHEET METAL (ADVANCED) 144 Hours

A continuation of SM 31 with increased emphasis on advanced work, theory, trade mathematics, terminology, drawings and blueprints that are applied to the production of typical sheet metal projects or jobs to illustrate the relationship of trade theory to trade practice; work on power driven equipment to close tolerances; maintenance and repair of machinery, safety.
PREREQUISITE: SM 31

SM 33 ROOFING/SPOUTING 40 Hours

Introduction, types of roofing and spouting, materials, practical applications, gutters, louvres, flashing, cornices, molding, ventilators, skylights, installations, safety, and estimating.

SM 40 FABRICATION DESIGN 184 Hours

A continuation of SM 32 with problems of increased complexity and difficulty: precision layout, design, fabrication, working to tolerances of 0.005"; architectural details, advanced blueprint reading, estimating, problem solving, production metal working; labor and management principles, manufacturing processes, live work; introduction to new metals and fabricating processes.
PREREQUISITE: SM 32

SM 41 VENTILATION (INDUSTRIAL/RESIDENTIAL) 192 Hours

Introduction to all phases of ventilation, general principles of ventilation, blower and exhaust systems; problem solving related to the movement of air, gases, and materials: hood design, specific operations, duct design, air cleaning equipment, fans, air h. p. load factors, pressure, volume, velocity, make-up and recirculated air, testing of systems, engineering data, design and fabrication of complete systems, building codes, specifications, safety, and estimating.

SM 42 SHEET METAL DRAFTING (ADVANCED) 96 Hours

Advanced layouts and complex designs that will be encountered by the tradesman, advanced blueprint reading, architectural items; layout and estimating complete installations.
PREREQUISITE: SM 22

SO 11 HAND, MACHINE TOOLS, AND BENCH WORK 96 Hours

Learning to use common tools and special tools of the trade, bench and machine tools for tapping, threading, reaming, grinding, honing, lapping and measuring.

SO 12 ENGINE PRINCIPLES 96 Hours

Fundamental knowledge of the construction, nomenclature, relationship of parts and principles of engines. Disassembly, inspection, reassembly and operation of engine. Oiling system. Piston and connecting rod repairs. Valve service. Timing of valves and ignition.

SO 13 DIESEL ENGINE MAINTENANCE 96 Hours

Principles of diesel construction, injection, and operation, disassembly of diesel engines, inspection of parts, proper repair procedures, and testing of engine

after repair. Proper operation of diesel engines. Starting and stopping procedures, cranking devices—care and servicing.

SO 15 MAINTENANCE OF EQUIPMENT 96 Hours

Proper methods of repair of various types of construction equipment. Track maintenance, clutch maintenance, transmission maintenance. Power control units. Cable maintenance. Disassembly, inspection, and reassembly of dozers, surface grader, roller, etc.

SO 16 OPERATION OF EQUIPMENT 96 Hours

Proper operational procedures for construction equipment. Dozer, scraper, grader, roller, shovel, loader, ditcher, and compressor operation. Rough grading, excavations, fills, ditching, and contouring methods of operation.

SO 17 RIGGING, HITCHES, AND SLINGS 40 Hours

Safety in rigging. Ropes, knots, and cables. Directional signs and hand signals for operators and pilots. Working strength ropes, lines, slings, splices and rigs.

SO 22 ENGINE PRINCIPLES 96 Hours

Fundamental knowledge of the construction, nomenclature, relationship of parts and principles of engines. Disassembly, inspection, reassembly and operation of engine. Oiling system. Piston and connecting rod repairs. Valve service. Timing of valves and ignition.

SO 23 DIESEL ENGINE MAINTENANCE 40 Hours

Principles of diesel construction, injection, and operation, disassembly of diesel engines, inspection of parts, proper repair procedures, and testing of engine after repair. Proper operation of diesel engines. Starting and stopping procedures, cranking devices—care and servicing.

SO 25 MAINTENANCE OF EQUIPMENT 96 Hours

Proper methods of repair of various types of construction equipment. Track maintenance, clutch maintenance, transmission maintenance. Power control units. Cable maintenance. Disassembly, inspection, and reassembly of dozers, surface grader, roller, etc.

SO 26 OPERATION OF EQUIPMENT 96 Hours

Proper operational procedures for construction equipment. Dozer, scraper, grader, roller, shovel, loader, ditcher, and compressor operation. Rough grading, excavations, fills, ditching, and contouring methods of operation.

SO 33 DIESEL ENGINE MAINTENANCE 96 Hours

Principles of diesel construction, injection, and operation, disassembly of diesel engines, inspection of parts, proper repair procedures, and testing of engine after repair. Proper operation of diesel engines. Starting and stopping procedures, cranking devices—care and servicing.

SO 34 LUBRICATION 96 Hours

Types of lubricants, special applications of lubricants, and characteristics of lubricants. Oils and greases. Detergency. Procedures for lubricating equipment. Records of lubrication. Engine oiling systems. Filter application, care and service.

SO 35 MAINTENANCE OF EQUIPMENT 96 Hours

Proper methods of repair of various types of construction equipment. Track maintenance, clutch maintenance, transmission maintenance. Power control

units. Cable maintenance. Disassembly, inspection, and reassembly of dozers, surface grader, roller, etc.

SO 36 OPERATION OF EQUIPMENT 136 Hours

Proper operational procedures for construction equipment. Dozer, scraper, grader, roller, shovel, loader, ditcher, and compressor operation. Rough grading, excavations, fills, ditching, and contouring methods of operation.

SO 38 ELECTRICAL SYSTEM 96 Hours

Service and repair of generators, regulators, motors, batteries, and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

SO 44 LUBRICATION 96 Hours

Types of lubricants, special applications of lubricants, and characteristics of lubricants. Oils and greases. Detergency. Procedures for lubricating equipment. Records of lubrication. Engine oiling systems. Filter application, care and service.

SO 45 MAINTENANCE OF EQUIPMENT 144 Hours

Proper methods of repair of various types of construction equipment. Track maintenance, clutch maintenance, transmission maintenance. Power control units. Cable maintenance. Disassembly, inspection, and reassembly of dozers, surface grader, roller, etc.

SO 46 OPERATION OF EQUIPMENT 144 Hours

Proper operational procedures for construction equipment. Dozer, scraper, grader, roller, shovel, loader, ditcher, and compressor operation. Rough grading, excavations, fills, ditching, and contouring methods of operation.

SO 47 RIGGING, HITCHES, AND SLINGS 40 Hours

Safety in rigging. Ropes, knots, and cables. Directional signs and hand signals for operators and pilots. Working strength ropes, lines, slings, splices and rigs.

SO 48 ELECTRICAL SYSTEM 48 Hours

Service and repair of generators, regulators, motors, batteries, and all other electrical components. Ignition system service—use of modern testing and servicing equipment. Lighting and warning devices. Circuitry and print reading.

SP 11 USE AND CARE OF TOOLS AND MATERIALS 16 Hours

Theory of paints, types of brushes, backgrounds.

SP 12 BASIC ALPHABETS 124 Hours

Gothic, Roman, Script, Text.

SP 13 LETTER STROKES 300 Hours

Vertical, horizontal, angular, curves.

SP 14 SIGN PAINTING SAFETY 16 Hours

Safe use of ladders; protection against fire; protection for eyes, skin and lungs.

SP 15 THEORY AND TESTS 16 Hours

Trade magazines, progress evaluation.

SP 21 BASIC BRUSH TECHNIQUES IN TEMPRA AND BULLETIN COLORS 360 Hours

Brush rolling, stroke finishing and squaring.

SP 22 PREPARING BACKGROUNDS 16 Hours
Woods, metals, glass, masonry.

SP 23 THUMBNAIL SKETCHES 144 Hours
Analyzing copy, making miniature layouts, determining proper proportions.

SP 31 ADVANCED SIGN PAINTING METHODS 152 Hours
Masking, spraying, pressure sensitive application.

SP 32 ESTIMATING 16 Hours
Labor, materials, overhead.

SP 33 SCALING 16 Hours
Measurement, enlargement, reduction.

SP 34 LETTERING ON GLASS 96 Hours
Stippling, outline, shading.

SP 35 INTRODUCTION TO BILLBOARD LAYOUT 48 Hours
Slogans, appeals, color.

SP 41 BILLBOARD PICTORIALS 136 Hours
Copying, color mixing, application.

SP 42 INTRODUCTION TO SCREEN PROCESS 48 Hours
Frame, silk, masking, cutting film, application.

SP 43 METALLIC LEAF APPLICATION 96 Hours
Surface guilding, glass guilding.

SP 44 SHOP MANAGEMENT 96 Hours
Production scheduling, customer relations, quality control, economical operation.

SP 45 THEORY 48 Hours
Plastics, erecting, Neon patterns and wiring.

SP 46 INTRODUCTION TO BILLBOARD LAYOUT 48 Hours
Slogans, appeals, color.

ST 10 PROFESSIONAL ADJUSTMENTS 30 Hours
Appreciation of operating room services and their relationship to the patient's restoration to health and ultimate return to society. Appreciation of the patient as an individual.

ST 12 ANATOMY AND PHYSIOLOGY 75 Hours
The necessity of saving specimens and proper method of same. The elementary principles of anatomy and physiology, and the procedures for post-mortem care. Basic terminology. Deviations from normal necessitating surgery.

ST 13 PRINCIPLES OF ASEPSIS 50 Hours
Developing and understanding the principles of bacteriology as they apply to sound practices of aseptic technique. Historical development of aseptic technique. The application of the principles of aseptic technique and the responsibilities in carrying out strict aseptic techniques.

ST 14 STERILIZATION AND CARE OF SUPPLIES 65 Hours

The application of bacteriological principles of sterile technique. The kinds, methods, and mechanics of sterilization. The purpose and importance of techniques of sterilization.

ST 15 OPERATING ROOM TECHNIQUE 130 Hours

Principles related to Pre-O. P. care and overall safety of patient. The development of skills as a member of the operating room team, the proper positioning. Applying the principles of bacteriology to the care of contaminated cases. Understanding the basic concepts of anesthesiology and the relationship to patient or OR team and the Anesthesiology Department. Skill in handling drapes, folding and packaging of goods. Suturing—understanding and applying suture needles. Learning the various instruments. The importance of accurate records and the need for recording specific data.

ST 20 MAJOR SURGERY 345 Hours

The procedures followed: scrub and circulate assistant, concurrent classroom instruction with clinical conference and major surgery.

ST 21 MINOR SURGERY 300 Hours

The procedures followed: scrub and circulate assistant, concurrent classroom instruction with clinical conference and minor surgery.

ST 22 CYSTOSCOPIES 100 Hours

Circulating assistant, concurrent classroom conference, and urology.

ST 23 HOUSEKEEPING 200 Hours

The proper care of a house or household.

ST 24 STERILIZATION AND CARE OF SUPPLIES 70 Hours

The application of bacteriological principles of sterile technique. The kinds, methods, and mechanics of sterilization. The purpose and importance of techniques of sterilization.

TD 10 BASIC DRAFTING 4 Credits—192 Hours

A study of basic drafting for those students who are majoring in Tool Design.

TD 11 TOOL DRAFTING 4 Credits—192 Hours

A study of tool drafting consisting of drawing technique, standard-size parts, drawing standards, standards for shop drawings, material lists, view selection and dimensioning.

PREREQUISITE: TD 10

TD 20 CUTTING TOOL DESIGN 4 Credits—192 Hours

A study of the design of single-edge cutting tools, boring bars and multiple-edged cutting tools.

PREREQUISITES: TD 10 and TD 11

TD 21 FIXTURE DESIGN 4 Credits—192 Hours

Fixture design deals with the design of leaf and tumble jugs, plain and index milling fixtures, vise jaws, chuck jaws, lathe fixtures, and adaptor plates.

PREREQUISITES: TD 10 and TD 11

TD 30 MECHANISMS I 4 Credits—192 Hours

This course consists of gears, cams, and linkages as they pertain to Tool Design.

PREREQUISITES: TD 20 and 21

TD 31 MECHANISMS II 4 Credits—192 Hours

This course consists of an advanced study of gears, cams, and linkages as they pertain to Tool Design.

PREREQUISITES: TD 20 and 21

TD 40 GAGE DESIGN AND PROGRAMMING 4 Credits—192 Hours

This course consists of the writing of programs for point to point and contoursing type tape controlled machines. And the design of plug gages, snap gages, ring gages, flush pin depth gage, length gage, and indicating gages.

PREREQUISITES: TD 10 and 11

TD 41 DIE DESIGN 4 Credits—192 Hours

This course is the designing of cutting, forming, drawing, and cavity dies, simple progressive and compound arrangements.

PREREQUISITES: TD 10 and 11

TI 10 DRAFTING 4 Credits—128 Hours

Instruction is given in basic drafting, sectional views, auxiliary views, revolutions, dimensioning, developments, intersections, assembly and detail drawings, gears, and cams.

TI 11 RENDERING I 4 Credits—128 Hours

This course provides fundamental training necessary to produce line and continuous tone drawings through the use of graphite pencil, carbon pencil, litho pencil, as well as various types of pens and ink, Benday Screen and scratch board.

TI 20 COLOR 4 Credits—128 Hours

This course provides color theory and training in the use and application of color. Full color rendering of products, as well as the use of flat colors and color aids such as Bourges art aids and color adhering sheets.

TI 21 PERSPECTIVE DRAWING 4 Credits—128 Hours

Instruction is given in one-point or parallel perspective, two-point or angular perspective. The projection method and the measuring plan method are emphasized.

TI 30 RENDERING II 4 Credits—128 Hours

This course is a continuation of Rendering I. It provides the fundamental training and the necessary skills required to produce pictures in the following mediums: Wash, tempra, airbrush and photo retouching.

TI 31 AXONOMETRIC DRAWING 4 Credits—128 Hours

Instruction is given in isometric, dimetric and trimetric projections, along with instruction in the use of some of the more popular industrial drawing aids.

TI 32 LAYOUT AND DESIGN 2 Credits—64 Hours

This course provides training in the basic fundamentals of layout. The student is required to make sketches, designs, thumbnail sketches, comprehensives, with emphasis on technique, structure, mechanics, awareness, and communication.

TI 40 ILLUSTRATION PRACTICES 4 Credits—128 Hours

This course provides training in preparing art for technical manuals and diversified art. The student makes advanced drawings employing all or various combinations of art techniques learned. This enables the student to prepare a

presentation folio preparatory to employment. This includes work in black and white, as well as color showing assemblies, cut-aways, exploded views, spot drawings, visual aids, lettering aids and art aids.

TI 41 TECHNICAL DRAWING 4 Credits—128 Hours

This phase of the course is a continuation of perspective and axonometric drawing courses. It is devoted to giving the student an opportunity to produce illustrations which will meet employment requirements. These illustrations include assembly, exploded, and cut-away views of mechanical objects.

TL 11 BASIC FUNDAMENTALS 96 Hours

The care and use of hand and power tools used in the trade. Basic operations in cutting and shaping tile and introduction to all the operations the tile setter will be called upon to perform.

TL 12 TILE MATERIALS 32 Hours

A thorough study of the different materials used in the manufacturing of tile in relation to the different procedures used in their installation. This course also includes the study of tile trim, angles, tile sizes, glazes and accessories.

TL 13 MASTIC INSTALLATION 120 Hours

The installation of tile with adhesives in wet and dry locations. Here the use and limitations of adhesives is stressed.

TL 14 BUILDING MAINTENANCE 224 Hours

This phase is used to simulate on the job training by installing permanent tile jobs in the college buildings.

TL 21 BASIC FUNDAMENTALS 56 Hours

Basic fundamentals and introduction to the basic operations in the installation of mosaic and quarry tile.

TL 22 LAYOUT 32 Hours

This course is designed to acquaint the student with the problems of job layout in regards to appearance, economy and labor.

TL 24 BUILDING MAINTENANCE 220 Hours

This phase is used to simulate on the job training by installing permanent tile jobs in the college buildings.

TL 25 MOSAIC AND QUARRY TILE 196 Hours

The installation of mosaic and quarry tile and floors and decks by the use of mastic, conventional mortar method and dry set Portland Cement methods.

TL 26 BLUEPRINT READING 16 Hours

This course is designed to instruct the student in the proper procedure in obtaining measurements and reading symbols from prints to be used for tile layouts and estimates.

TL 31 ESTIMATING 60 Hours

This course is designed to teach the student methods of estimating materials and costs of tile installations.

TL 32 CONVENTIONAL MORTAR METHOD 204 Hours

This course covers the type of installation that requires the tile setter to apply several coats of mortar plaster to different types of back up materials upon which the tile is installed.

TL 34 BUILDING MAINTENANCE 180 Hours

This phase is used to simulate on the job training by installing permanent tile jobs in the college buildings.

TL 35 DRY SET PORTLAND CEMENT METHOD 76 Hours

This method contains many steps used in the conventional mortar method with some variations. This phase will familiarize the student with the operations of this method and will stress its advantages.

TL 42 BASIC FUNDAMENTALS 65 Hours

Care and use of hand tools used in the linoleum trade. An introduction of the basic operations of the trade.

TL 43 SHEET GOODS 190 Hours

Installation of 6′ wide sheet goods by straight scribing, template scribing and "cutting in" methods. This course also includes sheet good materials, pastes and cements and correct selection of materials in relation to different floor areas.

TL 44 RESILIENT TILE 185 Hours

A course in the installation of 9 x 9 and 12 x 12 resilient tile including vinyl, vinyl asbestos and asphalt and the cements and pastic used in their installation.

TL 45 ESTIMATING 32 Hours

This course includes floor layout and cost estimates in relation to floor sizes and types of material used.

TT 01 BASIC MACHINE SHOP 2 Credits—96 Hours

Elementary machine shop work on Bench, Drill Press, Shaper, Engine Lathe and Milling Machine.

TT 02 BASIC MACHINE SHOP 2 Credits—96 Hours

Set-up and Operation on Turret Lathes and automatic Screw Machines. Introduction to quality control and the use of precision instruments.

TT 03 BASIC MACHINE SHOP 2 Credits—96 Hours

The use and types of grinding machines and grinding wheels. Cylindrical, internal and surface grinding. Introduction to Heat Treating, normalizing, carburizing, hardening, and tempering.

TT 10 BENCH WORK 1 Credit—48 Hours

Learning the use of hand tools to produce layouts and objects by hand. Simple filing, sawing, and assembling.

TT 11 DRILL PRESS 1 Credit—48 Hours

Types of drill presses, drill sharpening, drilling to a layout and use of drill jigs.

TT 12 ENGINE LATHE 3 Credits—144 Hours

Turning, facing, boring, tool-bit grinding, thread cutting.

TT 13 MILLING MACHINES 3 Credits—144 Hours

End, slab, and straddle milling including all types of straight and plain milling operations.

TT 14 SHAPER 1 Credit—48 Hours

Producing parallel, and square surfaces, shaping rectangular objects.

TT 20 TURRET LATHE AND AUTOMATIC SCREW MACHINES
4 Credits—192 Hours

Setup and operation of machines. Sequence of tooling, cam development.

TT 21 QUALITY CONTROL AND BLUEPRINT READING 3 Credits—144 Hours

Use of precision instruments. Reading mechanical drawings. Controlling the quality of work by the sampling method.

TT 30 BENCH WORK 1 Credit—48 Hours

Advanced precision filing, fitting, lapping, and assembling of precision parts as required on dies, jigs and fixtures.

TT 31 JIB BORER 1 Credit—48 Hours

Boring holes to very close dimensions and location, using micrometer measuring instruments on the machine.

TT 32 ENGINE LATHE 3 Credits—144 Hours

Advanced turning, face plate and chuck work. Thread cutting of all types of threads. Taper work.

TT 33 MILLING MACHINES 3 Credits—144 Hours

Producing spur gears. All types of indexing, spiral and cam milling.

TT 35 SHAPER 1 Credit—48 Hours

Advanced shaping of angles, radii, dovetails and irregular shapes.

TT 40 GRINDING MACHINES 6 Credits—288 Hours

Cylindrical, internal, surface, tool and cutter grinding. Thread grinding of studs, taps, etc. Use and types of grinding wheels and machines.

TT 41 HEAT TREATING 3 Credits—144 Hours

Normalizing, carburizing, hardening, and tempering of various types of steel. Heat treatment of metals.

TW 10 DESIGN AND WOOD 2 Credits—96 Hours

A careful study is made not only of the natural designs, but how they can be arranged to enhance their beauty. Some designs may be planned while other designs may be accidental. Emphasis will be placed on a well balanced and artistic design. A study of periods of furniture will be made as well as shapes of legs, etc., that are conductive to making a graceful and pleasing appearance. A glossary of furniture terms is also studied in order that the student may fully understand and appreciate the art. In the study of Wood, emphasis is placed on the various types of trees and their characteristics, including use, shrinkage, methods of sawing and uses to which they may be applied. Pressed wood, plasticized wood, flakewood and particle wood are analyzed and studied as to their practicability and usefulness.

TW 11 LAYING OUT—CUTTING STOCK—HAND TOOLS AND JOINERY
5 Credits—240 Hours

The proper use and care of hand tools such as chisels, squares, gauges, scales, etc. Gaining the feel necessary to correctly use the caliper and micrometer and all gauges necessary to setting up and operating production machinery. The theory underlying the design and action of cutting tools as they pertain to wood and its use, or the manufacturing of various products made from wood and its allied elements.

TW 20 MACHINE CUTTING 1 Credit—48 Hours

During the courses on Machine Cutting a great deal of emphasis will be placed on ways and methods of producing duplicate parts to an accuracy of .005 of an inch and using methods acceptable to the woodworking industry.

TW 21 WOOD SHOP MACHINES 4 Credits—182 Hours

Special emphasis will be placed on the safe use of all wood shop machines whether they be of general nature or a high speed production type of machine, as well as various possible set ups and cuts that can be performed with accuracy and dispatch.

TW 30 WOOD TURNING 1 Credit—48 Hours

In order that an operator of a wood lathe can be a safe operator and still produce an accurate product that will meet today's production standards, he must learn what tools to use to do a specific operation and the size he needs. This requires quite a bit of practice which may be classified as exercise projects.

TW 31 FASTENING 2 Credits—96 Hours

Methods of fastening wooden parts together in order to make a completed project has many varied methods and materials, which may include glues of all descriptions and their application, which must be studied in detail in order to keep up with our ever progressive system used by our industrial plants today. This will also include the correct and proper use of such items as screws, nails, clamps of all descriptions, drive nails or driven wood screws, just to name a few. A careful study will be made of joints made under certain conditions, such as temperature, moisture content and its effect upon its holding power as evidenced by a breaking test performed on an accurate testing machine.

TW 32 VENEERS AND VENEERING, LAMINATING, BENDING AND MOLDING 2 Credits—96 Hours

When working with veneers a person must understand how it is made and know its limitations. Emphasis will be placed on matching of veneers prior to gluing and the correct glues to use, also temperatures, humidity control must be studied and graphs kept in order to eliminate waste. Another phase of this course will be laminating of woods to get a certain desired effect as well as strength. The bending and molding of veneers must be accomplished by means of jigs and forms so a great deal of emphasis will be placed on this phase of the training.

TW 33 STRUCTURES 1 Credit—48 Hours

It is imperative that we understand the properties of wood and also the strength of the various species in order that an efficient, economical, and safe structure be made, whether it be a truss, rafter, joist or girder. It is, at this point, that we must study a great deal about stiffness and strength as evidenced by tests performed by the Forest Product Laboratories. Similar tests will be conducted during this course to determine the exact stiffness or strength of a given piece or panel in order to get the most economical and yet safe final product. Graphs and charts must be developed by each student on a given project.

TW 40 PATTERNMAKING 1 Credit—48 Hours

During this brief course in patternmaking, considerations for laying out a pattern must be studied, which deals with shrinkage of various metals and the need for a shrink rule. Each student will be required to make a simple pattern and remove the same from the sand, which will emphasize draft. Fillets and methods of applying them will also be taught along with the glossary of patternmaking terms. This course will clinch the need for a keen edge on woodworking tools and a lot of skill on the individual's part.

TW 41 FINISHING 1 Credit—48 Hours

During a course in finishing, emphasis must not only be placed on the preparation of the wood for the final finish, but a careful analysis must be made of the kind and type of final finish acceptable to industry that would make it both attractive and give it endurance. Thus varnishes, lacquers, french polish, just to name a few, must be studied and executed. Stains, oil paints and enamels must be analyzed as to its usefulness and practicability and also methods of application. The care and cleaning of all types of painting equipment is highly important as well as the application of various waxes to produce a pleasing appearance.

TW 42 BLUEPRINT READING 2 Credits—95 Hours

In this program, instruction will be given in blueprint reading consisting of plans submitted by industry exactly as they are using in their respective plants. Emphasis will be placed on that part of blueprint reading that will enable the individual to make-up cutting lists and have a complete picture and understanding of methods of assembly and construction. Cutting bills and work orders will also be studied.

TW 43 PRODUCTION JIGS AND FIXTURES 3 Credits—144 Hours

The quality of the finished product that has been produced by a machine operator greatly depends on well designed jigs and fixtures; therefore, it is highly important that all phases of jigs and fixtures be studied and built, so that the student can use this experience to adopt it to any given situation later on while in industry.

TW 44 KNIFE GRINDING AND LAYOUT 2 Credits—96 Hours

Students must learn the correct layout of knives and cutters so as to do an efficient neat job and at the same time be safe for operation, due to the excessive high speed at which the mandrels travel. This being a laboratory course, a number of practice pieces must be made from a rather inexpensive type of material before the student may grind the very expensive stock needed to cut and perform a professional job.

WE 01 ELEMENTARY ACETYLENE WELDING 80 Hours

This is a short course in basic acetylene welding and starts with shop safety and includes the welding of the five general types of joints in the flat, vertical, horizontal, and overhead positions using the forehand method. Material is of steel plate and sheet metal. Brazing of steel and free hand cutting are included.

WE 02 ELEMENTARY ELECTRIC WELDING 80 Hours

This is a short course in basic electric welding and covers joint preparation and set up to weld the butt, lap, tee, and corner joints in the flat, vertical, and overhead positions with different types and sizes of electrodes.

WE 03 ACETYLENE WELDING 96 Hours

This is a short course in acetylene welding, cutting and brazing related to the Auto, Diesel and Heavy Equipment courses. This course starts with shop safety and includes the welding of the five general types of joints in the flat, vertical and overhead position, with the forehand method. Material is of steel plate and sheet metal. The brazing and welding of cast iron and the brazing of steel specimens. Free hand cutting is included.

WE 04 ELECTRIC WELDING 96 Hours

This is a short course in electric welding and machine cutting related to the Auto, Diesel and Heavy Equipment courses. This course covers the joint preparation and set up to weld the butt, lap, tee and corner joints in the flat, vertical

and overhead positions. The welding of cast iron with non-machinable electrodes and hard surfacing of heavy equipment parts. Machine cutting is also included in this course.

WE 11 ACETYLENE WELDING POSITION 240 Hours

This is a basic acetylene welding and starts with shop safety and includes the welding of the five general types of joints in the flat, vertical, horizontal, and overhead position with both forehand and backhand methods. Material is of steel plate and sheet metal.

WE 12 ALLOY WELDING AND BRAZING 118 Hours

This course is for the more advanced acetylene welding student and covers the welding and brazing of aluminum plate and sheets in the flat, and vertical position, preparation and repair of aluminum castings and parts, white metal welding, brazing and welding of copper alloys, stainless steel welding, silver soldering and cast iron specimens.

PREREQUISITE: WE 11

WE 13 PIPE WELDING 144 Hours

This section is for the more advanced acetylene welder and includes the joint preparation and set up to weld in the horizontal and vertical position the following joints: butt, tee, laterals, tube turns, reducing tee, "Y's" and pipe blanking.

PREREQUISITES: WE 11 and WE 12

WE 14 ACETYLENE CUTTING 6 Hours

This course in acetylene cutting covers the free hand, straight line cutting and beveling with a torch, operation of a machine cutting torch and the set up and operation of a pipe beveling machine cutting torch.

WE 15 WELD TESTING 12 Hours

Adequate testing and inspection must be followed at all times to produce quality welds and welders. This course covers the standard methods for mechanical testing of welds; tensile, guided bend test, fillet and nick break, etch and free bend.

WE 20 ELECTRIC WELDING (POSITION) 340 Hours

This is a basic electric welding course and covers joint preparation and set up to weld the butt, lap, tee, corner and edge joints in the flat, vertical uphand, vertical downhand, horizontal and overhead positions with the different types and sizes of electrodes.

WE 21 PIPE WELDING 108 Hours

This course is for the more advanced electric welder and covers preparation, setup and welding in the horizontal and vertical positions; butt, tee, lateral, "Y's" and pipe blanking in the uphand and downhand method.

PREREQUISITE: WE 20

WE 22 CAST IRON WELDING 12 Hours

Cast iron is a complex alloy and is made up of different elements which makes successful welding difficult. In this course correct procedure, preparation and setup for the machinable and non-machinable electrodes for the repair of gear teeth, machine parts, farm machinery, automotive blocks and cast iron specimens.

PREREQUISITES: WE 20 and WE 21

WE 23 BLUEPRINT READING AND LAYOUT 48 Hours

This course is to help the competent welder to interpret the trade drawings that describe the work he must do. It covers basic lines, views, notes and specifications, dimensions, welding symbols, detail and assembly drawings and the layout of pipe joints. Procedures are presented without use of templates.

WE 24 WELD TESTING 12 Hours

This course covers the same methods used in WE 15.

WE 30 ACETYLENE AND ADVANCED AIRCRAFT 102 Hours

Aircraft welding involves better torch handling and techniques than regular acetylene welding and is a specialized field of its own; all joints are of SAE 4130 tubing and correspond to the joint design of the aircraft industry, also the welding of fittings of sheet metal and aluminum.

PREREQUISITE: WE 11

WE 31 INERT GAS SHIELD ARC WELDING (MIG & TIG) 358 Hours

This is a course in the inert gas shield arc technique (TIG) which is the manual process and (MIG) which is the short arc, high speed, semi-automatic. These two processes are used to weld the corrosive resistant metals; stainless steel, copper alloy, hard facing, steel, pipe, aluminum, aircraft tubing and white metal.

PREREQUISITES: WE 11, WE 20 and WE 30

WE 37 WELD TESTING 12 Hours

This course covers the same methods used in WE 15 and WE 24.

WE 40 ELECTRIC WELDING (CODE) 430 Hours

This is the more particular type of welding because the welding is being done to specifications and procedures recommended by AWS, API and ASME codes. This covers welding heavy plate in the flat, vertical, uphand, horizontal and overhead positions and the welding of pipe in the horizontal and vertical positions with electrodes recommended by the industry.

PREREQUISITES: WE 20 and WE 21

WE 41 SHEET METAL WELDING 30 Hours

This course covers the main factors governing the welding of sheet metal from 18 to 10 gauge. These are type and size of electrodes, fit up of joint, welding current, position of joint to be welded, control of distortion and the use of AC and DC current. The general types of joints are welded in the flat and vertical position.

PREREQUISITE: WE 20

WE 47 WELD TESTING 12 Hours

This course covers the methods used in WE 15, WE 24, WE 37.

WP 10 BASIC PATTERNMAKING 192 Hours

This course is designed to give the students a basic knowledge of what it takes to make a pattern such as pattern lumber, glues, wood screws, brads, and abrasives; also to teach the proper use and care of hand tools.

WP 11 MACHINE WOODWORKING 40 Hours

A course in the use and care of pattern shop equipment such as circular saws, band saws, jointer, planer, sanders, oscillating and disc, radical arm saw. The use of jig and fixtures.

WP 12 BASIC PATTERN CONSTRUCTION 96 Hours

This is a basic course in pattern construction, showing the types of joints used. Proper methods of gluing of lumber to produce strength, construction of one piece and two piece patterns.

WP 13 BASIC BLUEPRINT READING 48 Hours

This course is strictly a theory class covering the basic fundamentals of blueprint reading. Interpretation of one, two or more views, sectional views.

WP 20 BASIC PATTERNMAKING 192 Hours

To teach the students the construction of miscellaneous small patterns, such as one piece patterns, parted or split patterns. The proper use of lay out tools, such as dividers, shrink rules, squares, etc.

WP 21 BASIC FOUNDRY PRACTICE 40 Hours

A class room discussion on the different types of molding machines, molding materials and supplies and proper use and care.

WP 22 BASIC PATTERN CONSTRUCTION 96 Hours

Course in construction of patterns by using segments, staves and lagged type of work.

WP 23 BASIC COREBOX CONSTRUCTION 96 Hours

To teach the student how coreboxes are made for square or rectangular cores, semicircular boxes, and general features of corebox construction.

WP 24 ADVANCED BLUEPRINT READING 48 Hours

This is an advanced course in blueprint reading covering the detail sections, assembled drawing and auxiliary views, and projection of curved sections.

WP 30 ADVANCED FOUNDRY PRACTICE 96 Hours

A course where the students practice making their own green sand mold and dry sand cores from the project they had previously built.

WP 31 ADVANCED PATTERN CONSTRUCTION 192 Hours

This course is designed to teach how to construct patterns for lathe work, such as split pattern turning, face plate turning, chucking and re-chucking of patterns.

WP 32 ADVANCED COREBOX CONSTRUCTION 40 Hours

Proper construction of coreboxes with loose pieces, stepped up coreboxes, segmental construction.

WP 33 ADVANCED PATTERNMAKING 192 Hours

To teach the general application of patterns, examples illustrating different types of patterns and their relation to the mold. Use of core prints.

WP 40 ADVANCED PATTERN CONSTRUCTION 192 Hours

Making of patterns for wheels having webs, flanges and arms or spokes, making wheel without a pattern screw propeller patterns.

WP 41 ADVANCED COREBOX CONSTRUCTION 192 Hours

Construction of boxes to produce right and left hand sides, boxes with interchangeable members, cover coreboxes, and ram up cores.

WP 42 ADVANCED PATTERNMAKING 184 Hours

This course is to give a first-hand knowledge of production type patterns, such as master patterns, match plate work; also, the checking of patterns and core-boxes.

WT 11 ACETYLENE WELDING (POSITION) 7 Credits—336 Hours

This course is an introduction to elementary acetylene welding starting with shop safety, flame characteristics, metal identification, joint preparation, fore-hand and backhand welding of plate and sheet metal in all positions and the inspection of the finished product. Included also is freehand straight line cutting and beveling and machine cutting.

WT 20 ELECTRIC WELDING 8 Credits—384 Hours

This course is in basic electric welding and prepares a solid groundwork in welding for the student. It includes shop safety and welding the general types of joints with different types and sizes of electrodes in all positions.

WT 23 BLUEPRINT READING AND LAYOUT 1 Credit—48 Hours

This course is to help the skilled welder who is competent in manipulative skills to interpret the trade drawings that describes the work he must do. Emphasis is placed on the importance of welding symbols and their uses and are considered an integral part of blueprint reading and layout.

WT 33 ADVANCED ACETYLENE WELDING (ALLOY) 1 Credit—48 Hours

In this course, instruction is given in the more advanced and specialized type of Oxy-acetylene welding. This includes the welding and brazing of aluminum, copper and copper alloy welding, die cast or white metal welding, silver soldering and cast iron brazing.

PREREQUISITE: WE 11

WT 34 ADVANCED ELECTRIC WELDING 3 Credits—144 Hours

In this course, the more difficult portions of welding are encountered. The welding of pipe in all positions, this includes butt, flange, tee, lateral and "Y" joints, stainless steel in the flat and vertical positions, aluminum welding, dissimilar metals and sheet metal. Acetylene cutting is also included.

PREREQUISITE: WE 22

WT 35 INERT GAS SHIELDED ARC (TIG) 3 Credits—144 Hours

Inert gas shielded arc welding was developed to weld the corrosive and hard to weld metals. This course deals with the manual welding of steel, stainless steel, aluminum and copper alloys in the flat, vertical and overhead positions.

PREREQUISITES: WE 22 and WE 34

WT 36 PIPE LAYOUT AND FABRICATION 1 Credit—48 Hours

The purpose of this course is to simplify pipe layout. Procedures are presented for layout without templates and the fittings made from pipe are welded in the manner subscribed for by the called for code. These fittings are turns, tee's, laterals, reducers and pipe blanking.

PREREQUISITE: WE 34

WT 37 PHYSICAL TESTING OF WELDS 1 Credit—48 Hours

The quality of welding depends upon competent inspection and adequate testing. This course covers the following types of testing: free bend, root, face, tensile and nick break. Close inspection is made of each weld specimen.

WT 43 ADVANCED ACETYLENE WELDING (AIRCRAFT) 1 Credit—48 Hours

Aircraft welding is a specialized field of its own and involves more precision and better techniques in torch handling than regular acetylene welding. In this course, all welded joints are of SAE 4130 tubing, sheet metal and aluminum, and correspond to the joint design of the Aircraft Industry.

PREREQUISITE: WE 11

WT 44 ADVANCED ELECTRIC WELDING (CODE) 3 Credits—144 Hours

This course of welding is most particular because the student is welding to specifications and procedures recommended by the American Welding Society. The procedures covered by this section are the ASME, section VIII, unfired pressure vessels and the AWS Specifications for Welded Highway and Railway Bridges.

PREREQUISITE: WE 22

WT 45 INERT GAS SHIELDED ARC (MIG) 4 Credits—192 Hours

Inert Gas shielded arc is the short arc, high speed, semi-automatic and automatic process. In this course steel plate, pipe, aluminum and stainless steel are welded in the flat, vertical and overhead position. Some acetylene cutting is included in this unit.

PREREQUISITES: WE 33 and WE 34

WT 47 PHYSICAL TESTING OF WELDS 1 Credit—48 Hours

The purpose of this course is to teach the principal methods of testing and inspection used to determine the soundness, quality and efficiency of a welded joint or weldment. The quality of welding depends upon competent inspection and adequate tests prescribed by governing standards or codes.

THE WILLIAMSPORT AREA COMMUNITY COLLEGE

SCHOOL OF APPLIED ARTS AND SCIENCES

GENERAL EDUCATION COURSE DESCRIPTIONS

SOCIAL STUDIES FOR THE ASSOCIATE DEGREE IN APPLIED ARTS AND SCIENCES

EC 11 SOCIAL STUDIES 3 Credits—48 Hours

A study of the basic principles of our economy, definitions of economic terminology, the American capitalistic system, types of business enterprises, money and banking systems and policies, credits and collections, business cycles.

Fundamentals of real estate, investments, stock market operation, business and market fluctuation, personal policies and procedures used in modern-day industry. Job Procurement—showing personnel procedures and application forms used in present-day industry, problems faced by applicants in job interviewing, use of resumes in job application.

MATHEMATICS IN APPLIED ARTS AND SCIENCES

CERTIFICATE COURSES

GM 11 ARITHMETIC/ALGEBRA 3 Credits—48 Hours

A general review of the fundamental operations of arithmetic extended to shop related problems. An introduction to algebra designed for the shop student. Covers algebraic concepts through the solution of linear equations with one unknown.

GM 12 GEOMETRY/TRIGONOMETRY 3 Credits—48 Hours

Mensuration and simple geometric concepts with shop applications: solutions involving ruler and compass constructions. The trigonometry involves the solution of right and oblique triangles. It includes the six functions and their uses, the law of sines, and the law of cosines with shop applications. This course can be used as a refresher or for those students who have not had algebra and trigonometry in high school, but who wish to enter the Technical Unit.

PREREQUISITE: GM 11 or successful completion of test

ENGLISH FOR THE ASSOCIATE DEGREE IN APPLIED ARTS AND SCIENCES

TE 01 BASIC ENGLISH 48 Hours

Designed for students lacking a solid foundation in the accepted practices of the English language, TE 01 is a course in the fundamentals of grammar, spelling, and vocabulary improvement. TE 01 is a prerequisite for TE 11, TE 21, and BM 21 for those candidates for Associate Degrees who have weak backgrounds in English as indicated by entrance examination grades.

TE 11 ENGLISH COMPOSITION 3 Credits—48 Hours

Writing to develop clear thinking, good organization and accurate self expression in the writing of technical reports. It is essentially to be a course in composition. The score on the classification test will determine whether or not the student will be required to complete English TE 01.

TE 21 ENGLISH 3 Credits—48 Hours

TE 21 is a basic course in the organization of oral reports, with emphasis on the fundamentals of speech, including methods of organizing talks to inform and to persuade. Speech practice and evaluation are stressed. Leadership training and parliamentary procedure are included.

MATHEMATICS FOR THE ASSOCIATE DEGREE IN APPLIED ARTS AND SCIENCES

TM 02 BASIC ALGEBRA 80 Hours

This course gives a background in basic concepts of algebra through linear equations in two unknowns. It also includes basic concepts of mensuration and

other geometry necessary to the solution of trigonometric problems in the various technologies. This course is intended as a preparation for the technical mathematics sequence.

TM 11 ALGEBRA 3 Credits—48 Hours

This starts with a review of basic algebra and then covers topics of advanced algebra as outlined: Functions and graphs; system of linear equations; exponents and radicals; quadratic equations with one unknown; simultaneous quadratic equations; ratio, proportion, variation; binomial theorem, progressions.

PREREQUISITE: One year of algebra and one year of geometry

TM 12 NUMERICAL TRIGONOMETRY 3 Credits—48 Hours

This course includes learning the use of the slide rule, applications of geometry, logarithms, and numerical trigonometry. Solutions to the right triangle, oblique triangle, and trigonometric applications are stressed.

PREREQUISITE: TM 11

TM 13 ALGEBRA-TRIGONOMETRY 5 Credits—80 Hours

This course presents the mathematical background necessary for most of the technician program. It consists of the following topics: Slide rule, applications in geometry, functions and graphs, linear equations and systems, exponents and radicals, quadratic equations, logarithms, right and oblique triangles.

PREREQUISITE: Two years of high school mathematics, including algebra and geometry or equivalent

TM 21 ANALYTICAL TRIGONOMETRY 4 Credits—64 Hours

This course is a continuation of TM 13 and will complete the mathematics for most of the technicians. It consists of the following topics: Simultaneous quadratics, ratio, proportion and variation, binomial theorem and progressions, exponential functions, vectors, trigonometric applications, formulas, identities and equations, graphs of the trigonometric function, complex numbers and position vectors.

PREREQUISITE: TM 13 or equivalent

TM 23 FINITE MATHEMATICS 3 Credits—48 Hours

This course consists of an introduction to logic, sets, matrices, and determinants. The topics covered include multiplication and division of matrices, scalar multiplication, vectors and linear equations, evaluation of determinants, cofactors, the adjoint matrix, system of equations, and matrix inversion.

PREREQUISITE: TM 13 or equivalent

TM 24 ENGINEERING STATISTICS 3 Credits—48 Hours

This course deals with the following basic concepts of statistics: the use of graphs, frequency distributions, sampling, correlation, regression, and probability.

PREREQUISITE: TM 13 or equivalent

TM 31 CALCULUS I 4 Credits—64 Hours

This course is presented for the technologies oriented more towards engineering. It is designed to meet the needs of the technician without getting involved in mathematical theory or concepts necessary for the more advanced engineer. It covers the following topics: Graphical methods, empirical equations, differentiation through implicit functions, integration, volume by integration, and Simpson's rule.

PREREQUISITE: TM 21 or equivalent

TM 41 CALCULUS II 3 Credits—48 Hours

This course is a continuation of TM 31. It covers the following topics: Centroids and moments, radius of gyration, introduction to differential equations, probability and statistics.

PREREQUISITE: TM 31 or equivalent

SCIENCE FOR THE ASSOCIATE DEGREE IN APPLIED ARTS AND SCIENCES

TS 21 PHYSICS—MECHANICS 4 Credits—64 Hours

This is a lecture, demonstration, problem solving course in elementary mechanics. The student is introduced to basic concepts of the scientific method, the metric system, vectors, translatory, rotary, uniform circular motion, work, power, and energy, and the physical properties of liquids, solids and gases.

PREREQUISITES: TM 11 and TM 12 or equivalent, and one year high school general science

TS 22 INTRODUCTORY CHEMISTRY AND METALLURGY 4 Credits—64 Hours

This is a lecture demonstration course covering the basic concepts and principles of chemistry. It also includes a study of the chemical metallurgy and properties of metals and alloys used in engineering practice.

PREREQUISITE: TM 11

TS 31 PHYSICS—ELECTRICITY AND MAGNETISM 4 Credits—64 Hours

This course deals with the fundamental concepts of electrostatics, electrolysis; AC and DC circuits, magnetism, electromagnetic induction and the basic principles of electricity.

PREREQUISITE: TS 21

TS 32 PHYSICS—HEAT AND LIGHT 3 Credits—48 Hours

This course covers the basic principles of heat and measurements, thermometry, calorimetry, expansion of liquids, solids and gases, transfer of heat. The study of light includes topics on reflection, refraction, illumination, optics and color.

PREREQUISITE: TS 21

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